

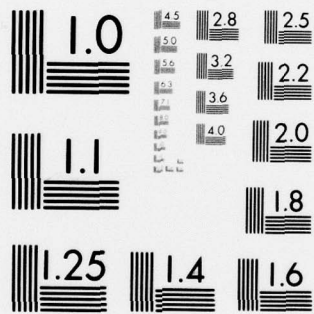
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MICROCOPY RESOLUTION TEST CHART
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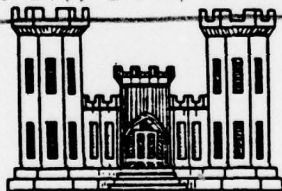
DELAWARE RIVER BASIN

POCONO LAKE DAM
MONROE COUNTY, PENNSYLVANIA

(NDS I. D. NO. ^{umber} PA 00781
DER I. D. NO. ^{umber} 45-222)

6 PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM.

Pocono Lake Dam
Delaware River Basin, Monroe County,
Pennsylvania. Phase I Inspection Report,



15 DACW31-79-C-0017

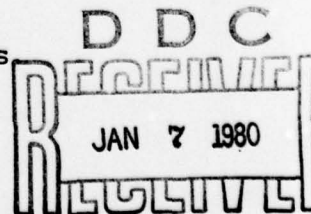
Prepared by:

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10 John/Boschuk, Jr.
John Henry/Frederick, Jr.
Submitted to:

12 98

DEPARTMENT OF THE ARMY
Baltimore District, Corps of Engineers
Baltimore, Maryland 21203



11 JULY 1979

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ORIGINAL CONTAINS COLOR PLATES: ALL DDC
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PREFACE

Accession For	NTIS Grant	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams for Phase I Investigations. Copies of these guidelines may be obtained from the Office of the Chief of Engineers, Washington, D. C., 20314. The purpose of a Phase I investigation is to expeditiously identify those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify the need for more detailed studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected, and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the spillway design flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. The spillway design flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

Name of Dam: Pocono Lake Dam
County Located: Monroe County
State Located: Pennsylvania
Stream: Tobyhanna Creek
Coordinates: Latitude 41° 5.8'
Longitude 75° 32.4'
Date of Inspection: 10 May 1979

[Cont'd from p. 1]

Pocono Lake Dam, owned by the Pocono Lake Preserve, was built as a result of the failure of the previous timber crib dam in August 1955, during Hurricane Diane. This concrete dam was designed by Justin & Courtney of Philadelphia, Pennsylvania, and was built in 1956 by Reed and Kuhn Contractors. The facility is considered to be in good condition and well maintained. The dam is classified as a "High" hazard structure consistent with its potential for extensive property damage and possible loss of life downstream in the event of failure. The dam is classified as an "Intermediate" size dam by virtue of its 22,430 acre-foot total storage capacity and 47 foot height.

The available documentation, specifications and visual inspection provided sufficient information to evaluate the embankment and appurtenant structures in accordance with the provisions of the Phase I Inspection Program.

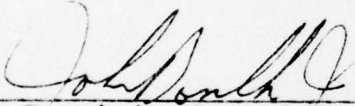
The hydrologic and hydraulic calculations presented in Appendix C indicate the dam will pass the Probable Maximum Flood without overtopping. Therefore, the spillway system is considered to be "Adequate".

Visual inspection of the dam and reservoir detected no significant problems with the structure. There was some leakage noted around the stilling basin walls, which was assessed to be drainage from the rock toe. Some minor cracking of the spillway walls was noted and the loss of some joint sealer was noted in the bridge. These conditions are not considered to be critical.

Based on the findings presented in this report, it is recommended that the following measures be taken.

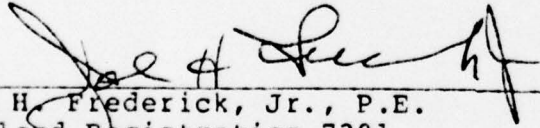
1. Woody vegetation along the downstream slopes of the embankment should be removed on a periodic basis.
2. Seepage around the end walls of the spillway should be monitored, at least visually, for changes in rates or turbidity.
3. Minor cracking noted along the downstream section of the spillway retaining walls should be monitored annually and, if the cracks increase, they should be repaired.
4. The joint sealer beneath the bridge decking should be replaced as soon as practical to prevent collection of foreign material which, when subject to freeze/thaw cycles, would cause spalling.

Due to the location of the dam and the potential for extensive property damage and possible loss of life in the event of failure, a formal procedure of observation and warning during periods of high precipitation should be developed and implemented. This procedure should include a method of warning and possibly evacuating residents along the creek. An operation and maintenance procedure should also be developed to insure that all items are carefully inspected on a regular basis and maintained in the best possible condition.


 John Boschuk, Jr., P.E.
 Pennsylvania Registration 27450E
 Woodward-Clyde Consultants

7/30/79
 Date

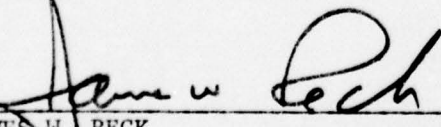



 John H. Frederick, Jr., P.E.
 Maryland Registration 7301
 Woodward-Clyde Consultants

7/30/79
 Date



APPROVED BY:


 JAMES W. PECK
 Colonel, Corps of Engineers
 District Engineer

11 Sep 79
 Date



OVERVIEW
POCONO DAM, MONROE COUNTY, PENNSYLVANIA

TABLE OF CONTENTS

	<u>PAGE</u>
Preface	i
Assessment and Recommendations	ii
Overview Photograph	iv
 SECTION 1 - PROJECT INFORMATION	
1.1 General	1
1.2 Description of Project	1
1.3 Pertinent Data	3
 SECTION 2 - ENGINEERING DATA	
2.1 Design	5
2.2 Construction	5
2.3 Operational Data	5
2.4 Evaluation	5
 SECTION 3 - VISUAL INSPECTION	
3.1 Findings	7
3.2 Evaluation	8
 SECTION 4 - OPERATIONAL PROCEDURES	
4.1 Procedures	9
4.2 Maintenance of the Dam	9
4.3 Maintenance of Operating Facilities	9
4.4 Warning Systems In Effect	9
4.5 Evaluation	9
 SECTION 5 - HYDROLOGY/HYDRAULICS	
5.1 Evaluation of Features	10
 SECTION 6 - STRUCTURAL STABILITY	
6.1 Evaluation of Structural Stability	12
 SECTION 7 - ASSESSMENT/REMEDIAL MEASURES	
7.1 Dam Assessment	13
7.2 Remedial Measures	13
 APPENDIX	
A Engineering Data, Design, Construction and Operation	
B Visual Inspection	
C Hydrology/Hydraulics	
D Photographs	
E Plates	
F Geology	

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM
POCONO LAKE DAM
NATIONAL ID #PA 00781
DER #45-222

SECTION 1
PROJECT INFORMATION

1.1 General.

a. Authority. The Dam Inspection Act, Public Law 92-367, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a program of inspection of dams throughout the United States.

b. Purpose. The purpose of the inspection is to determine if the dam constitutes a hazard to human life or property.

1.2 Description of Project.

a. Dam and Appurtenances. Pocono Lake Dam is a concrete ogee spillway with concrete non-overflow sections keyed on each side into a zoned earth embankment. The embankment contains an upstream impervious fill protected with three feet of dumped riprap over a one foot filter bed. The upstream slope below elevation 1,635 is 2.5H:1V, and above elevation 1,635 the slope is 2H:1V. The downstream slope contains an impervious zone against the concrete non-overflow section; a random fill zone; and a rock toe separated from the random zone with one foot of filter stone. The slope is 2H:1V and protected with eight inches of stone having a three inch maximum size. Plan and typical embankment sections are shown on Plates 2 and 5, Appendix E. The right embankment, beyond the concrete non-overflow section, is about 115 feet long with a 25 foot wide crest. The corresponding left embankment is about 130 feet long with a 25 foot wide crest. The concrete overflow and non-overflow sections are founded on rock and both embankments have an impervious core trench excavated to rock. A grout curtain with maximum 20 foot deep holes and 10 foot center to center spacings was installed under the entire structure. Borrow materials for the embankments were obtained within the reservoir area.

Counted on page 117

The central portion of the dam is the concrete ogee type spillway, 31 feet above the foundation and 216 feet long. A 15 foot wide concrete bridge for one-way vehicular traffic and pedestrians is supported on four concrete piers over the

spillway. The distance between the underside of the bridge to the spillway crest is about 15 feet. Each pier is four feet wide with a semicircular upstream section.

The concrete stilling basin at the downstream toe is 50 feet long and about 4 feet deep. The basin is concrete paved and the downstream end contains a concrete sill four feet above the basin floor. The stilling basin is bounded on each side by concrete training walls which extend 10 feet beyond the end sill. Typical sections of the stilling basin, end sill, chute and baffle blocks and training walls are shown on Plate 4, Appendix E.

The dam contains a 30-inch I.D. drawdown pipe through the spillway at elevation 1,610.25 under each of the two center piers. Each gate can be operated from the upstream side of the pier at bridge level. Trash racks cover both intakes. A gated low flow discharge pipe, 10 inches in diameter under the extreme right pier, discharges through the spillway. Typical sections of the discharge pipe are shown on Plates 4 and 6.

b. Location. The dam is located on Tobyhanna Creek in Tobyhanna Township, Monroe County, Pennsylvania. The site is shown on USGS Quadrangle entitled "Blakeslee, Pennsylvania" at coordinates N 41° 5.8' W 75° 32.4'. A regional location plan of Pocono Lake Dam is enclosed as Plate 1, Appendix E.

c. Size Classification. The dam is classified as an "Intermediate" size dam by virtue of its 22,430 acre-foot total storage capacity and 47 foot height.

d. Hazard Classification. A "High" hazard classification is assigned consistent with the potential for extensive property damage and loss of life along the stream.

e. Ownership. The dam is owned by Pocono Lake Preserve. All correspondence should be sent to Mr. Baldwin Avery, General Manager, Pocono Lake Preserve, Pocono Lake, Pennsylvania 18348.

f. Purpose of Dam. The purpose of this dam is recreational.

g. Design and Construction History. During Hurricane Diane, August 1955, an existing timber crib dam, approximately 250 feet upstream of the present dam, breached. As a result of this failure, Pocono Lake Preserve retained Justin & Courtney*, consulting engineers of Philadelphia,

* Justin & Courtney, division of O'Brien & Gere, Syracuse, New York.

Pennsylvania, to design the present dam. . On April 6, 1956, the "Report Upon the Application of Pocono Lake Preserve" was prepared and the construction permit issued April 11, 1956. Construction began during the summer of 1956, and Mr. T. W. Beland of Justin & Courtney served as resident engineer. Mr. S. L. Ritchie, of Reed & Kuhn, was the contractor's superintendent.

Limited available records in Department of Environmental Resources' files indicated that all work was performed in a highly satisfactory manner. Details as to specific construction test results, such as in place density tests and concrete testing, were not available. However, monthly inspection reports and job summaries were available, which indicated that all of these tests were satisfactory. By early 1957, the dam was completed and the reservoir was filled between May and July 1957. Throughout this period, the required minimum flow of 11.28 cubic feet per second was maintained downstream.

h. Normal Operating Procedures. Under normal conditions, all excess flow is discharged over the concrete ogee spillway. Minimum flow is maintained through the 10-inch pipe embedded in the ogee section and shown on Plate 6. The original requirement for a minimum 11.28 cfs flow, including measurement, has been waived as no flow is diverted by the structure and two tributaries enter Tobyhanna Creek below the dam within the boundaries of the preserve. The normal operating procedure is to maintain a minimum flow through the 10-inch pipe.

1.3 Pertinent Data.

A summary of pertinent data for Pocono Lake Dam is presented as follows.

a.	Drainage Area (sq miles)	75.4
b.	Discharge at Dam Site (cfs)	
	Spillway	
	Water at Design Elevation	27,750
	Water at Top of Dam	44,525
	Low Flow Discharge	11.28
c.	Elevation (feet above MSL)	
	Top of Dam	1,650
	Spillway Crest	1,633
	Design High Water	1,644
	Stilling Basin End Sill	1,607

	Stilling Basin Floor	1,603
	Minimum Flow Pipe (invert)	1,614.08
	Pond Drain Invert	1,610.25
	Downstream Toe Elevation	1,610±
d.	Reservoir (miles)	
	Length at Normal Pool	2.8
	Fetch at Normal Pool	1.8
e.	Storage (acre-feet)	
	Normal Pool	5,402
	At Top of Dam	22,430
f.	Reservoir Surface Area (acres)	
	Normal Pool	518
g.	Dam Data	
	Type	Concrete nonoverflow section keyed into zoned earth fill w/ downstream rock toe
	Length (including spillway)	580 feet
	Height	47 feet
	Crest Width	25 feet
	Volume	(to be determined)
	Side Slopes	
	Upstream	
	Above Elevation 1,635	2H:1V
	Below Elevation 1,635	2.5H:1V
	Downstream	2H:1V
	Cutoff (under embankment section)	Cutoff trench; 10' base width w/ 1H:1V slopes
	Grout Curtain	Single line grout curtain, 20' deep, 10' hole spacings
h.	Principal Spillway	
	Type	Reinforced concrete ogee crest
	Length	216 feet (including 4 bridge piers)
	Discharge Basin	Concrete stilling basin with baffle & chute blocks

SECTION 2 ENGINEERING DATA

2.1 Design.

a. Availability. A summary of engineering data for Pocono Lake Dam is presented in the checklist attached as Appendix A. Principal documents containing data used for this report include the "Report Upon the Application of Pocono Lake Preserve" dated April 6, 1956, by the State of Pennsylvania; several construction reports; a complete set of design drawings; and other miscellaneous documentation. Documentation specifically pertaining to construction, such as in place density test results, gradation curves and concrete test results, were not available in Department of Environmental Resources' (DER) files. Selected portions of the drawings are included in Appendix E of this report.

b. Design Features. Principal design features are illustrated on the plan, profile and cross-section plates of the embankment and spillway, enclosed as Appendix E, Plates 2 through 6. A description of the design features is presented in Section 1.2 entitled "Description of Project". Under normal pool conditions, the reservoir level is at the crest of the principal spillway, elevation 1,633.

2.2 Construction.

A description of the construction history is presented in Section 1.2, paragraph g.

2.3 Operational Data.

There are no operational records maintained. Minimum flow is maintained by a 10-inch pipe located through the principal spillway section. There are no water level measurements or rainfall records maintained within this watershed by the Owner. A staff gage is located on the right training wall of the stilling basin, but this gage is unserviceable as the letters have faded.

2.4 Evaluation.

a. Availability. All engineering data reproduced in this report and studied for this investigation were provided by either the Pennsylvania DER or the Owner's representatives.

b. Adequacy. The data included in State files and supplemented by discussions with the Owner's representative are considered adequate to evaluate the dam and appurtenant structures.

c. Validity. There is no reason to question the validity of this data.

SECTION 3 VISUAL INSPECTION

3.1 Findings.

a. General. Observations and comments of the field inspection team are contained in the checklist enclosed herein as Appendix E, and are summarized and evaluated as follows. In general, the dam and its appurtenant structures are considered to be in good condition and well maintained. At the time of inspection, the reservoir level was at the spillway crest.

b. Dam. During the visual inspection, there were no surface cracks, unusual movement at or beyond the toe of the dam, unusual sloughing, or erosion of the embankment or abutment slopes. Vertical and horizontal alignments of the crest were checked and found to be in good condition. There were no observed riprap failures. The junction between the embankment and non-overflow section of the spillway is considered in good condition. Some minor woody vegetation was growing along the downstream slope of the embankment, which should be removed during routine maintenance of the structure. Seepage noted at the rock toe of the embankments on either side of the spillway was observed to be discharging into the stilling basin around the training walls. This seepage is considered normal for a rock toe without a perforated collection pipe.

c. Appurtenant Structures.

The concrete ogee spillway section was observed to be in very good condition, with no unusual distortion, cracks or excessive spalling of the concrete. Some minor cracking was observed along the downstream section of the spillway walls, as shown on sheet 5a and on photographs in Appendix D. Vertical and horizontal alignments were checked and found to be satisfactory. The monolith joints were inspected, where possible, and found to be in good condition. Construction joints were also observed to be in good condition. However, some deterioration of the joint sealer was noted beneath the bridge decking joints, resulting in deterioration of pier tops. This should be repaired during normal maintenance.

The minimum flow release gate was exercised and found to operate properly. At the time of inspection, minimum flow was being discharged downstream in addition to excess flow over the spillway crest. Both pond drain gates were exercised and observed to function properly.

d. Reservoir. The reservoir side slopes are generally flat, well vegetated to the water's edge with trees and some homes along the edge of the reservoir. Sedimentation is probably concentrated in the upper reaches of the reservoir and has little or no effect on flood water storage.

e. Downstream Channel. The creek flows through woods and is wide and stable. The creek bed is rocky and there was no debris noted. The valley gradient downstream from the dam is approximately 0.003. Side slopes of the channel are roughly 2H:1V. Approximately 3.2 miles below the dam, Tobyhanna Creek passes under PA Route 115, where there are three or four homes subject to damage in the event of failure. These homes justify the "High" hazard classification.

3.2 Evaluation.

Inspection of the dam and appurtenant facilities disclosed no evidence of apparent past or present movement that would indicate existing instability of the dam or spillway system. All gates were exercised and observed to function properly. All external features of the embankment were inspected and observed to be in very good condition. In summary, the dam and its appurtenant facilities are very well maintained and in good condition.

SECTION 4 OPERATIONAL PROCEDURES

4.1 Procedures.

Operation of the dam does not require a dam tender. All flow discharges directly over the ogee crest of the principal spillway and downstream into Tobyhanna Creek.

4.2 Maintenance of the Dam.

The dam is maintained by the Pocono Lake Preserve employees. Maintenance work includes periodic mowing of the grass, repair of the riprap and removal of debris from embankment slopes.

4.3 Maintenance of Operating Facilities.

Maintenance of the operating facilities is also performed by employees of the Pocono Lake Preserve, which includes clearing the spillway of debris and insuring that all gates are cleaned, well greased and operating properly.

4.4 Warning Systems In Effect.

There are no formal warning systems or procedures established to be followed during periods of exceedingly heavy rainfalls.

4.5 Evaluation.

There are no written operational procedures, maintenance procedures or any type of warning system. Maintenance and operating procedures should be developed, including a checklist of items to be observed, operated and inspected on a regular basis.

Since a formal warning procedure does not exist, one should be developed and implemented during periods of extreme rainfall. This procedure should consist of a detailed method of notifying residents downstream that potentially high flows are imminent or a dangerous condition is developing.

SECTION 5 HYDROLOGY/HYDRAULICS

5.1 Evaluation of Features.

a. Design Data. Readily available design data was limited to statements in the application report prepared by the State and the construction drawings. Hydrologic and hydraulic evaluations performed in conjunction with this inspection are contained in Appendix C.

The 75.4 square mile watershed is predominantly wooded with no major/large towns. The watershed is about 11.7 miles long and averages about 7.6 miles wide. Elevations range from 2,200 feet to 1,633 at normal pool level. There are at least eight upstream dams, the largest of which is Lake Naomi Dam, located 1.8 miles upstream of the headwaters of Pocono Lake or 3.9 miles upstream of Pocono Lake Dam, controlling 19.5 square miles of the watershed. There are four dams upstream of Lake Naomi. Other dams upstream of Pocono Lake are: Tamaqua Lake, 4.8 miles upstream of Pocono Lake Dam; Mill Pond No. 1, 7.6 miles upstream of the dam on Tobyhanna Creek; and Tobyhanna, 9.6 miles upstream of Pocono Lake Dam on Tobyhanna Creek. The watershed also contains several swamps with an estimated area of four to five square miles. While residential development is continuing within the watershed, runoff characteristics are not expected to change significantly in the near future.

The application report indicated a spillway discharge of 29,000 cfs with a design head of 11 feet, and a discharge of 46,100 cfs with the reservoir level at the underside of the bridge, or 15 feet. The spillway capacity was considered adequate by the State.

In accordance with criteria established by Federal (OCE) Guidelines, the recommended spillway design flood for this "Intermediate" size dam and "High" hazard classification is the Probable Maximum Flood (PMF).

b. Experience Data. No reservoir level records or rainfall records are maintained for this dam by the Owner. There are two rain gaging stations within the watershed and one 2.8 miles west of the dam, which report to the National Weather Service.

c. Visual Observations. At the time of inspection, there were no conditions observed that would indicate a reduced spillway capacity during an extreme event. Other

observations regarding the condition of the downstream channel, spillway and reservoir are located in Appendix B and discussed in detail in Section 3.

d. Overtopping Potential. Overtopping potential of this dam was estimated using "HEC-1, Dam Safety Version", computer program. A brief description of the program is included in Appendix C. The upstream dam, Lake Naomi, was also inspected under the National Dam Inspection Act. The results of that investigation were available for evaluation of Pocono Lake Dam. Lake Naomi's spillway is rated as "Inadequate". The computer program was run twice, one assuming Lake Naomi and its upstream dams did not fail and one assuming failure of Lake Naomi and two of its upstream dams. Failure of any other upstream dam is assessed to have little effect on Pocono Lake Dam.

Calculations for this investigation essentially confirm the spillway evaluation made in the application report prepared by the State, with an estimated discharge of about 27,750 cfs at the design head of 11 feet. The HEC-1 program computed the peak PMF inflow to be 50,868 cfs assuming no upstream dam failures and 51,752 cfs assuming upstream failures. As shown in Appendix C, the spillway can pass the PMF under both conditions. The maximum reservoir level is conservative as no allowance has been made for flood storage in Tamaqua Lake, Millpond No. 1, Tobyhanna Lake or the extensive marshy/swamp areas.

e. Spillway Adequacy. As the spillway will pass the PMF without overtopping, the spillway is considered to be "Adequate".

f. Downstream Conditions. Tobyhanna Creek flows through a fairly wide, wooded flood plain for about 3.2 miles until it passes under PA Route 115, where there are three or four homes subject to damage in the event of failure. These residences justify the "High" hazard classification. The creek enters the Lehigh River about 9.8 miles below the dam.

SECTION 6 STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability.

a. Visual Observations. Visual observations detected no evidence of existing or pending embankment or spillway instability. Upstream and downstream slopes of the embankment appear to be stable, in good condition and well vegetated. Downstream slopes on the right and left embankments contain woody vegetation, which at the present time is not critical, but should be removed during routine maintenance of the structure. Seepage noted around the training walls of the principal spillway is flowing from the rock fill toe drains and is considered normal for this type of structure. The seepage was observed to be clear, with no signs of turbidity. The spillway and bridge deck were inspected and found to be in good condition. There was some minor cracking, but this does not appear to be structural cracking associated with instability or other unsafe conditions.

b. Design and Construction Data. Design and construction data was limited principally to the drawings, of which selected sections are presented in Appendix E. These drawings present in great detail the principal features of both the embankment and the spillway system, as well as several specifications on the various components of the system. There were no stability analyses of the embankments available in the file. Maximum embankment height above rock is less than 40 feet and less than 25 feet above original ground. Therefore, an assessment of the embankment stability is qualitative. For the embankment materials used and specified compaction, the embankment slopes appear to be reasonable. Stability analyses were performed on the concrete overflow and non-overflow sections for design high water and ice load conditions. The sections have adequate factors of safety against sliding and overturning. See Plate 8, Appendix E.

c. Operating Records. There are no operational records for this structure.

d. Post-Construction Changes. There are no reports nor is there any evidence that modifications were made to this dam.

e. Seismic Stability. The dam is located in Seismic Zone 1. Normally it can be considered that if a dam in this zone is stable under static loading conditions, it can be assumed safe for any expected earthquake conditions. Since the embankment static stability analysis was not available for review, the seismic stability could not be assessed.

SECTION 7 ASSESSMENT/REMEDIAL MEASURES

7.1 Dam Assessment.

a. Evaluation. Visual inspection and review of the design and construction documentation indicates that the dam, foundation and appurtenant structures, including the spillway of Pocono Lake Dam, are in very good condition. The hydrologic and hydraulic computations presented in Appendix C indicate that the structure will pass the Probable Maximum Flood without overtopping. Therefore, the spillway system for this structure is considered to be "Adequate". In the event the dam fails during an extreme event, extreme property damage and probable loss of life would be expected, thus justifying the "High" hazard classification.

b. Adequacy of Information. The information available from DER files and the visual inspection are sufficiently adequate to evaluate the dam and appurtenant structures.

c. Urgency. It is recommended that the suggestions presented in Section 7.2 be implemented during routine maintenance of the dam.

7.2 Remedial Measures.

a. Facilities. It is recommended that the following measures be taken.

1. Woody vegetation along the downstream slopes of the embankment should be removed on a periodic basis. Once they are removed, the area should be reseeded to establish dense grass/Crownvetch vegetation.
2. Seepage around the end walls of the spillway, which emerges from the toe drain of the embankments, should be monitored, at least visually, for changes in rates or the presence of turbidity. Should either occur, this condition should be inspected by a registered professional engineer experienced in the design of dams.
3. Minor cracking noted along the downstream section of the spillway retaining walls should be monitored annually and, if the cracks increase, they should be repaired.

4. The joint sealer beneath the bridge decking should be replaced as soon as practical. If the joint is allowed to remain open and fill with soil or water, spalling at the joints could occur.

b. Operation and Maintenance Procedures. Because of the location of the dam and the potential for extreme property damage and possible loss of life in the event of failure, a formal procedure of observation and warning during periods of high precipitation should be developed and implemented. This procedure should include a method of warning downstream residents that high flows are expected and provisions for evacuating these people in the event of an emergency. In addition, an operation and maintenance procedure should also be developed to insure that all items are carefully inspected on a regular basis and maintained in the best possible condition.

APPENDIX

A

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

NAME OF DAM Pocono Lake Dam
ID # PA 00781

REMARKS
Sheet 1 of 4

AS-BUILT DRAWINGS
Construction drawings were available as prepared by
Justin and Courtney and are presented in Appendix E.

REGIONAL VICINITY MAP
See Plate 1, Appendix E.

CONSTRUCTION HISTORY
Data was not available in DER files.

TYPICAL SECTIONS OF DAM
See Plates in Appendix E.

OUTLETS - PLAIN
DETAILS
CONSTRAINTS
DISCHARGE RATINGS
RAINFALL/RESERVOIR RECORDS
See Plates in Appendix E.

- Not available in DER files
- Records are not maintained in this watershed.

ITEM	REMARKS
DESIGN REPORTS	Formal report was not available but boring logs and stability data available in DER files.
GEOLOGY REPORTS	No data in DER files. See Appendix F for data collected for this report.
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM STABILITY	<div> <div>Not available in DER files.</div> <div>One page plan (D-1) containing the stability analysis of the structure prepared by Justin and Courtney, Philadelphia, Pennsylvania.</div> <div>Not available in DER files.</div> </div>
SEEPAGE STUDIES	
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD	Boring logs were available and performed by Sprague and Hemwood, Company.
POST-CONSTRUCTION SURVEYS OF DAM	None
BORROW SOURCES	Unknown.

ITEM	REMARKS
MONITORING SYSTEMS	None
MODIFICATIONS	None
HIGH POOL RECORDS	No data in DER files.
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	None
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	Original dam (250 feet upstream) failed in 1955. The present concrete dam replaced the original timber dam.
MAINTENANCE OPERATION RECORDS	No data in DER files.

ITEM	REMARKS
SPILLWAY PLAN	See Appendix E.
SECTIONS	
DETAILS	
OPERATING EQUIPMENT PLANS & DETAILS	See Appendix E.
MISCELLANEOUS	<ol style="list-style-type: none"> 1. Water Resources Inventory Form. 2. Pennsylvania State Inspection Reports 3. "Report Upon the Application of Pocono Lake Preserve" dated April 6, 1956. 4. "Application" dated 28 March 1956.
	<ol style="list-style-type: none"> 1. Designer of Concrete Dam: Justin and Courtney, Philadelphia, Pennsylvania 2. Contractor: Reed and Kuhn

APPENDIX

B

CHECK LIST
VISUAL INSPECTION
PHASE I

Sheet 1 of 11

Name Dam Pocono Lake Dam County Monroe State Pennsylvania National ID # PA 00781
Type of Dam Concrete Hazard Category I-High
Date(s) Inspection 10 May '79 Weather Cloudy and Cool Temperature 60's
(P.M.)

Pool Elevation at Time of Inspection 1633.2 M.S.L. Tailwater at Time of Inspection 1607⁺ M.S.L.

Inspection Personnel:

John Boschuk, Jr. (Geotechnical) Raymond Lambert (Geologist) John H. Frederick (Geotechnical)
Mary F. Back (Hydrologist) Vincent McKeever (Hydrologist)

John Boschuk, Jr. Recorder

Remarks:

Mr. Baldwin Avery, General Manager, was on site and provided assistance.

CONCRETE/MASONRY DAMS

Sheet 2 of 11

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
ANY NOTICEABLE SEEPAGE	None observed through the concrete structure.	
STRUCTURE TO ABUTMENT/EMBANKMENT JUNCTIONS	Good condition.	
DRAINS	None	
WATER PASSAGES	Not available.	
FOUNDATION	No evidence was found to indicate problems associated with the foundation.	

CONCRETE/MASONRY DAMS

Sheet 3 of 11

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS CONCRETE SURFACES	<i>Relatively good condition.</i>	
STRUCTURAL CRACKING	<i>No major cracking was observed but minor cracking was noted on the downstream section of the spillway retaining walls. See Sheet 5a and photographs.</i>	
VERTICAL AND HORIZONTAL ALIGNMENT	<i>Good</i>	
MONOLITH JOINTS	<i>Good condition.</i>	
CONSTRUCTION JOINTS	<i>Good condition. Some deterioration of the joint sealer was noted beneath the bridge decking which should be repaired.</i>	

EMBANKMENT

Sheet 4 of 11

<u>VISUAL EXAMINATION OF</u>	<u>OBSERVATIONS</u>	<u>REMARKS OR RECOMMENDATIONS</u>
SURFACE CRACKS	<i>None observed. Crest is asphalt paved.</i>	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	<i>None observed.</i>	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	<i>None observed.</i>	
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	<i>Good condition.</i>	
RIPRAP FAILURES	<i>None observed.</i>	

EMBANKMENT

Sheet 5 of 11

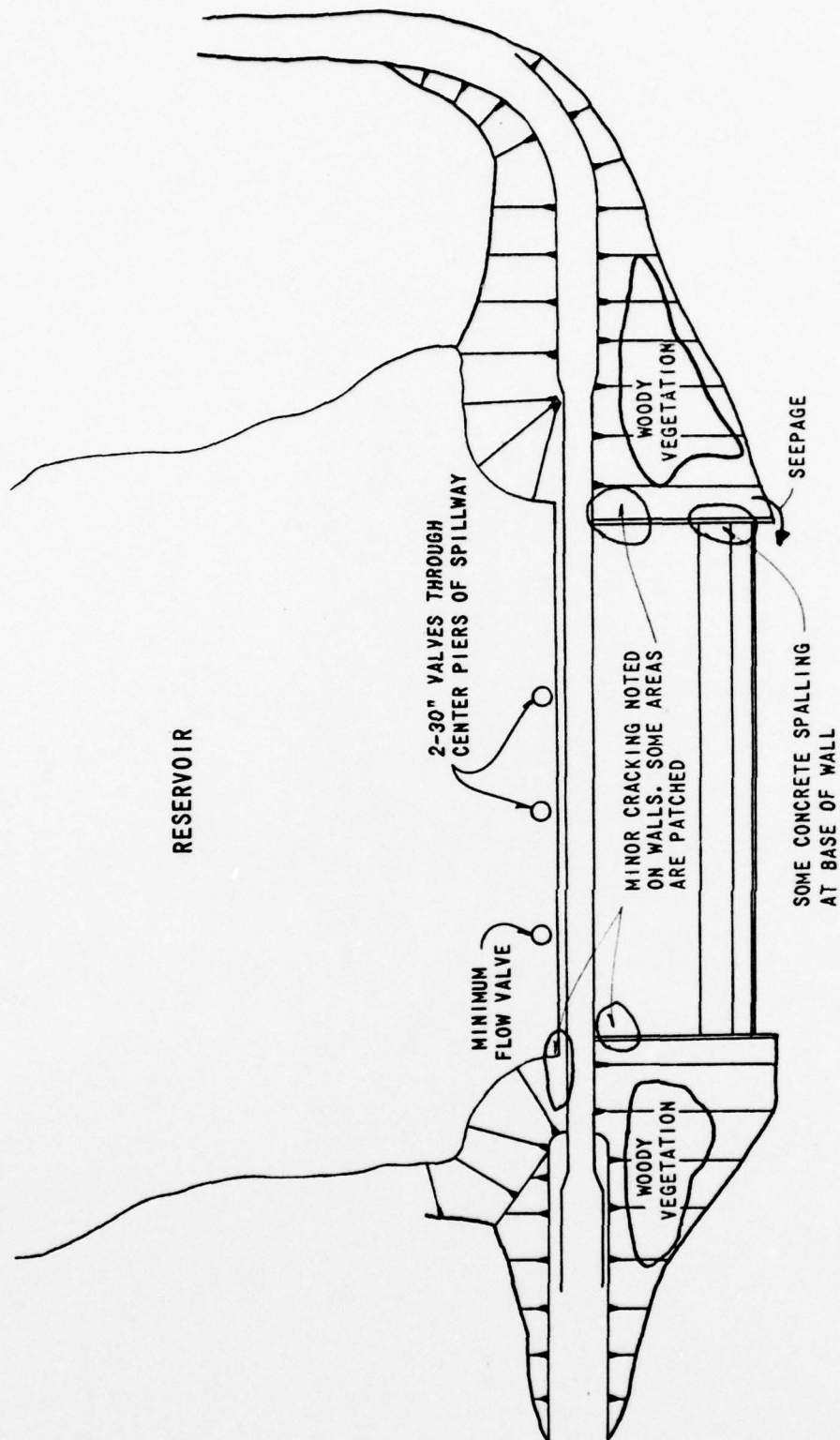
VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
-----------------------	--------------	----------------------------

JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	Good condition.	
---	-----------------	--

ANY NOTICEABLE SEEPAGE	See Sheet 5a, for seepage locations.	
------------------------	--------------------------------------	--

STAFF GAGE AND RECORDER	Gage on downstream, right spillway wall is not legible.	
-------------------------	---	--

DRAINS	None. Downstream rock toe controls embankment seepage.	
--------	--	--



FIELD OBSERVATION PLAN
POCONO DAM

SHEET 5A OF 11

OUTLET WORKS

Sheet 6 of 11

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	None observed.	
INTAKE STRUCTURE	Underwater, could not be observed.	
OUTLET STRUCTURE	Observed to be in good condition.	
OUTLET CHANNEL	All flows discharge into spillway stilling pool.	
EMERGENCY GATE	Gate was exercised and observed to function satisfactorily.	

UNGATED SPILLWAY

Sheet 7 of 11

<u>VISUAL EXAMINATION OF</u>	<u>OBSERVATIONS</u>	<u>REMARKS OR RECOMMENDATIONS</u>
------------------------------	---------------------	-----------------------------------

CONCRETE WEIR	Good condition.	
---------------	-----------------	--

APPROACH CHANNEL	None	
------------------	------	--

DISCHARGE CHANNEL	Good condition.	
-------------------	-----------------	--

BRIDGE AND PIERS	Good condition but joints need some minor repairs.	
------------------	--	--

RETAINING WALLS	Some spalling noted at base of retaining walls as shown on Sheet 5a and photographs. This spalling should be repaired.	
-----------------	--	--

GATED SPILLWAY

Sheet 8 of 11

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SILL	<i>None</i>	
APPROACH CHANNEL	<i>None</i>	
DISCHARGE CHANNEL	<i>None</i>	
BRIDGE AND PIERS	<i>None</i>	
GATES AND OPERATION EQUIPMENT	<i>None</i>	

INSTRUMENTATION

Sheet 9 of 11

<u>VISUAL EXAMINATION</u>	<u>OBSERVATIONS</u>	<u>REMARKS OR RECOMMENDATIONS</u>
MONUMENTATION/SURVEYS	None	
OBSERVATION WELLS	None	
WEIRS	None	
PIEZOMETERS	None	
OTHER	None	

RESERVOIR

Sheet 10 of 11

<u>VISUAL EXAMINATION OF</u>	<u>OBSERVATIONS</u>	<u>REMARKS OR RECOMMENDATIONS</u>
SLOPES	The reservoir side slopes are generally flat, well vegetated to water's edge with trees, some homes along edge of reservoir.	

SEDIMENTATION

Any sedimentation has little or no effect on flood water storage.

DOWNSTREAM CHANNEL

Sheet 11 of 11

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	The creek flows through woods, is wide and stable. The bed is rocky, no debris noted.	
SLOPES	The valley gradient is about 0.003. The side slopes are about 2H:IV.	
APPROXIMATE NO. OF HOMES AND POPULATION	About 3.2 miles below the dam, Tobyhanna Creek passes under PA. Rt. 115 where there are three or four homes subject to damage in the event of failure.	

APPENDIX

C

POCONO DAM
CHECK LIST
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: Predominantly wooded, several upstream dams, some residential development.

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): 1633.06 feet (5402 Acre-Feet).

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): 1650 feet (22430 Acre-Feet).

ELEVATION MAXIMUM DESIGN POOL: 1644.0 feet.

ELEVATION TOP DAM: 1650 feet

SPILLWAY:

a. Elevation 1633.06 feet.

b. Type Concrete ogee weir.

c. Width 216 feet including four 4 foot wide bridge piers.

d. Length -----

e. Location Spillover Center.

f. Number and Type of Gates None.

OUTLET WORKS:

a. Type 2- 30 inch pipes.

b. Location Through two center bridge piers.

c. Entrance inverts 1610.25 feet.

d. Exit inverts 1610.25 feet.

e. Emergency draindown facilities The above outlet works.

HYDROMETEOROLOGICAL GAGES:

a. Type Standard rain gages.

b. Location Within watershed.

c. Records Weather Service gages maintained by others.

MAXIMUM NON-DAMAGING DISCHARGE: Not determined.

HEC-1, REVISED
FLOOD HYDROGRAPH PACKAGE

The original "Flood Hydrograph Package" (HEC-1), developed by the Hydrologic Engineering Center, Corps of Engineers, has been modified for use under the National Dam Inspection Program. The "Flood Hydrograph Package (HEC-1), Dam Safety Version", hereinafter referred to as, HEC-1, Rev., has been modified to require less detailed input and to include a dam breach analysis. The required input is obtained from the field inspection of a dam, any available design/evaluation data, relatively simple hydraulic calculations, or information from the USGS Quandrangle maps. The input format is flexible in order to reflect any unique characteristics of an individual dam.

HEC-1, Rev. computes a reservoir inflow hydrograph based on individual watershed characteristics such as: area, percentage of impervious surface area, watershed shape, and hydrograph characteristics determined from regional correlation studies by the Corps of Engineers, Baltimore District. The inflow is routed through the reservoir using spillway discharge data obtained from the field inspection or design data. Flood storage capacity is determined from USGS maps or design information and verified by the field inspection. In the event a spillway cannot discharge 0.5 PMF without overtopping and failure of the dam, downstream channel characteristics obtained from the field inspection and USGS maps are inputted and flows are routed downstream to the damage center and a dam breach analysis is performed.

Included in this Appendix are the HEC-1, Rev. pertinent input values and a summary print-out tables.

BY MEB DATE 6/6/79 SUBJECT _____ SHEET 9 OF 22
 CHKD. BY QJ DATE 6/28/79 Pocono Dam JOB No. _____
Hydrology / Hydraulics

Classification (Ref. Recommended Guidelines for Safety Inspection of Dams)

1. The hazard classification is "High" as failure would result in loss of life.
2. The size classification is "Intermediate" based on its 47 ft. height and 22,430 Ac.-ft. total storage capacity
3. The spillway design flood, based on size and hazard classification, is the Probable Maximum Flood (PMF).

Hydrology and Hydraulic Analysis

1. Readily available design data was limited to statements in the "Application Report" prepared by the State in 1956. The spillway capacity was considered adequate for the 75.2 sq. mile watershed. Spillway capacity for the 200 ft. ogee weir was given as: $H_o \sim 11$ ft.
 $Q = 29,000$ cfs at $H = 11$ ft. (design head)
 $Q = 46,100$ cfs at $H = 15$ ft. (to underside of bridge)
2. Evaluation of structure was by use of computer program. Computer input as follows:

Inflow Hydrograph

Drainage Area - total from USGS maps, 75.4 sq. miles ✓
 1.8 miles upstream of Pocono Lake (and 3.9 miles above Pocono Dam) is Lake Naomi, 45-1. There are four dams upstream of Lake Naomi. Lake Naomi Dam has also been inspected under the Nation Dam Inspection Act and the results of that inspection were available for this investigation.

Rainfall, shown on computer sheets, Ref-Hydro-meteorological Report No. 33.

Snyder's hydrograph parameters, tp & C_p

$$tp = C_t (L \cdot Lca)^{0.3}$$

$C_t = 2.1$
 $C_p = 0.45$ } Information received from Corps of Engineers, Baltimore, for Zone 2.

BY MEB DATE 6/15/72

SUBJECT

SHEET 4 OF 22CHKD. BY [signature] DATE 6/21/74Pocono Dam

JOB No

Hydrology / Hydraulics

L, Lca & drainage area determined from
USGS maps

Sub-area	L (miles)	Lca (miles)	tp	area* (sq. miles)
Lynchwood	2.46	0.95	2.71	3.4
Pocono Summit	4.28	1.61	3.75	3.2
Stillwater	3.03	1.14	3.04	6.6
Lake Naomi North	4.64	2.75	4.51	2.0
Lake Naomi South	4.36	2.65	4.38	4.3
Pocono Lake	14.58	8.05	8.77	55.9

* uncontrolled area above dam, not necessarily total drainage area above dam.

Reservoir Routing

elevation - storage

normal storage of all dams taken from DER Water Resources Bulletin No. 5

flood storage estimated from USGS maps.

normal & total capacity shown on sheets 17, 18 & 19.

elevation - discharge

discharges for upstream dams were calculated by the computer using $Q = C L H^{3/2}$ and information given below. Any auxiliary spillway discharge and/or flow over the top was calculated by the computer assuming critical depth.

Lynchwood Lake

C = 2.6 Ref. Table 5-3, King & Brater, Handbook

L = 24 ft (measured) of Hydraulics

auxiliary spillway, 65 ft higher, 220 ft long

Pocono Summit (two dams assumed acting as one)

C = 3.3 Ref. Table 5-3

L = 20 ft (measured)

Stillwater Lake

C = 2.7 Ref Table 5-3

L = 60 ft (measured)

BY MFB DATE 6/15/79

SUBJECT

SHEET 5 OF 22CHKD. BY gjp DATE 4/18/79Pocono Dam

JOB No.

Hydrology / Hydraulics

Lake Naomi

L = 100 ft. (measured)

discharge calculated by critical depth
auxiliary spillway, 350 ft wide, 0.4 to 0.7 ft
higherPocono Dam - Ref Chow, Open Channel Hydraulics,
p. 364

$$X^n = K H_d^{n-1} Y$$

H_d = design head excluding velocity head of
approach

$$n = 1.825$$

$$K = 1.928$$

From drawing

4/3 face = 3H:1SV elev.	X	Y	calc. H _d
1633.06	0	0	
1632'-6 3/4"	3'	0.4975'	11.825'
1631'-2 1/4"	6'	1.8725'	11.036'
1629'-1 1/2"	9'	4.047'	11.037'
1626'-4 3/8"	12'	6.66	10.985

use H_d = 11.0 ftstage-discharge Ref- Design of Small Dams, USBR, /
shown on sheet 10. p. 373

$$L = L' - 2(N K_p + K_a) H_c$$

H_c = total head on crestK_p = pier contraction coefficient = 0.01

N = number of piers = 4

L' = net length = 200

K_a = abutment contraction coefficient = 0.20assume no velocity of approach & H_d = 11.0 ft

$$L = 200 - 2(4 \cdot 0.01 + 0.20) 11$$

$$= 194.7 \text{ ft say } 195$$

using fig 249 & 250, C = 3.9

$$Q = 195 \cdot 3.90 \cdot 11^{3/2} = 27,745 \text{ cfs}$$

BY MEB DATE 6/18/79 SUBJECT Pocono Dam SHEET 6 OF 22
CHKD. BY [Signature] DATE 6/21/79 Hydrology / Hydraulics JOB No. _____

Overlapping Potential -

The effect of upstream Tamaque Lake Dam, 45-126, 15 ft. high, 4.9 miles above Pocono Dam on Beaver Creek (a tributary of Upper Tunkhannock) was neglected because of its small (1.6 sq miles) drainage area. Millpond No. 1, no DER number, and Tobyhanna Lake, 45-36, located 11.2 and 13.2 miles above Pocono Dam, have also been neglected because of their distance and the several bridge openings and marsh/swamp areas Tobyhanna Creek passes thru.

As shown on sheet 19, the spillway passes the full PMF without overtopping the roadway, assuming no upstream dam failures. A second computer run assumes upstream Lynchwood Lake, Pocono Summit and Lake Naomi Dams to fail. The spillway discharges the PMF without overtopping the bridge (sheet 22).

The following sheet is from the Lake Naomi Inspection report.

Spillway Adequacy

The spillway is rated as "Adequate" as the spillway will pass the PMF without overtopping the dam.

MFB

6/18/79

Pocono Dam
Hydrology/Hydraulics

34. 8 of 22

PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

```

RUNOFF HYDROGRAPH AT      LLI
ROUTE HYDROGRAPH TO      LLO
RUNOFF HYDROGRAPH AT      PSI
ROUTE HYDROGRAPH TO      PSO
RUNOFF HYDROGRAPH AT      SWI
COMBINE 3 HYDROGRAPHS AT  SWTI
ROUTE HYDROGRAPH TO      SWO
RUNOFF HYDROGRAPH AT      LMS
RUNOFF HYDROGRAPH AT      LMN
COMBINE 3 HYDROGRAPHS AT  LNT
ROUTE HYDROGRAPH TO      LNO
ROUTE HYDROGRAPH TO      LND
RUNOFF HYDROGRAPH AT      PLI
COMBINE 2 HYDROGRAPHS AT  PLT
ROUTE HYDROGRAPH TO      PLD
END OF NETWORK

```

```

1*****
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION  JULY 1978
LAST MODIFICATION 26 FEB 79
*****

```

```

RUN DATE* 79/06/13.
TIME* 13.56.20.

```

```

POCONO DAM
NAT ID NO. PA 00781 DER NO. 45-222
OVERTOPPING ANALYSIS

```

NO	NHR	NMIN	IDAY	JOB SPECIFICATION				IPRT	NSTAN
				IHR	IMIN	METRC	IPRT		
200	0	30	0	0	0	0	-4	0	
JOPER				NUT	LROPT	TRACE			
			5	0	0	0			

```

MULTI-PLAN ANALYSES TO BE PERFORMED
NPLAN= 1 NRTIO= 3 LRTIO= 1
RTIOS= .50 .70 1.00

```

MFB 6/18/79

POCONO DAM
HYDROLOGY/HYDRAULICS

SH. 9 OF 22

SUB-AREA RUNOFF COMPUTATION

LYNCHWOOD LAKE INFLOW HYDROGRAPH

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
LLI	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

INHYG	IUNG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	3.39	0.00	75.40	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	22.30	87.00	100.00	111.00	118.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS .860

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.00	.05	0.00	0.00

UNIT HYDROGRAPH DATA

TP= 2.75 CP= .45 NTA= 0

RECESSION DATA

STRTO= -1.50 BRCSN= -.05 RTIOR= 2.00

UNIT HYDROGRAPH 50 END-OF-PERIOD ORDINATES, LAG= 2.76 HOURS, CP= .45 VOL= 1.00

24.	88.	178.	269.	335.	356.	335.	299.	267.	238.
213.	190.	170.	151.	135.	121.	108.	96.	86.	77.
68.	61.	55.	49.	43.	39.	35.	31.	28.	25.
22.	20.	18.	16.	14.	12.	11.	10.	9.	8.
7.	6.	6.	5.	4.	4.	4.	3.	3.	3.

NO. DA	HR. MN	PERIOD	RAIN	EXCS	LOSS	COMP 0	NO. DA	HR. MN	PERIOD	RAIN	EXCS	LOSS	COMP 0
--------	--------	--------	------	------	------	--------	--------	--------	--------	------	------	------	--------

SUM 22.63 20.25 2.38 89942.
(575.)(514.)(60.)(2546.87)

HYDROGRAPH ROUTING

LYNCHWOOD LAKE OUTFLOW HYDROGRAPH

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
LL0	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPNP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTD	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-1881.	0

CAPACITY= 0. 285. 800.

ELEVATION= 1861. 1881. 1890.

CREL	SPWID	COBW	EXPW	ELEV	COOL	CAREA	EXPL
1881.0	24.0	2.6	1.5	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COOD	EXPD	DAMWID
1883.0	0.0	0.0	0.

CREST LENGTH AT OR BELOW ELEVATION	220.	370.	1200.
	1881.5	1883.0	1884.0

MFB 6/18/79

POCONO DAM
HYDROLOGY/HYDRAULICS

SH. 10 OF 22

SUB-AREA RUNOFF COMPUTATION

POCONO SUMMIT INFLOW HYDROGRAPH

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
PSI	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUNG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	3.21	0.00	75.40	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PHS	R6	R12	R24	R48	R72	R96
0.00	22.30	87.00	100.00	111.00	118.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS .860

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	000	1.00	0.00	0.00	1.00	1.00	.05	0.00	0.00

UNIT HYDROGRAPH DATA

TP= 3.75 CP= .45 NTA= 0

RECESSION DATA

STRTO= -1.50 ORCSN= -.05 RTIOR= 2.00

UNIT HYDROGRAPH 68 END-OF-PERIOD ORDINATES, LAG= 3.75 HOURS, CP= .45 VOL= 1.00

11.	40.	81.	129.	177.	217.	243.	251.	240.	221.
203.	187.	172.	158.	145.	134.	123.	113.	104.	96.
88.	81.	74.	68.	63.	58.	53.	49.	45.	41.
38.	35.	32.	30.	27.	25.	23.	21.	20.	18.
17.	15.	14.	13.	12.	11.	10.	9.	8.	8.
7.	7.	6.	6.	5.	5.	4.	4.	4.	3.
3.	3.	3.	2.	2.	2.	2.	2.	2.	

NO.DA	HR.NN	PERIOD	RAIN	EXCS	LOSS	COMP Q	NO.DA	HR.NN	PERIOD	RAIN	EXCS	LOSS	COMP Q
-------	-------	--------	------	------	------	--------	-------	-------	--------	------	------	------	--------

SUM	22.63	20.25	2.38	84368.
	(575.)	(514.)	(60.)	(2389.04)

HYDROGRAPH ROUTING

POCONO SUMMIT OUTFLOW HYDROGRAPH

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
PSO	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPWP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTD	LAG	ANSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-1825.	0

CAPACITY= 0. 215. 1265.

ELEVATION= 1817. 1825. 1832.

CREL	SPWID	COBW	EXPW	ELEVL	COBL	CAREA	EXPL
1825.0	20.0	3.3	1.5	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COBW	EXPB	DAMWID
1826.5	0.0	0.0	0.

CREST LENGTH	500.	1000.
AT OR BELOW ELEVATION	1826.5	1830.0

MFB 6/18/79

POCONO DAM
HYDROLOGY/HYDRAULICS

SH. 11 OF 22

SUB-AREA RUNOFF COMPUTATION

STILLWATER LAKE INFLOW HYDROGRAPH

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
SWI	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

INHYG	IUNG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISANE	LOCAL
1	1	6.56	0.00	75.40	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	22.30	87.00	100.00	111.00	118.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS .860

LOSS DATA

LROPT	STRKR	DLTKR	RTIO	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSHX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.00	.05	0.00	0.00

UNIT HYDROGRAPH DATA

TP= 3.04 CP= .45 NTA= 0

RECESSION DATA

STRTO= -1.50 GRCSN= -.05 RTIOR= 2.00

UNIT HYDROGRAPH 55 END-OF-PERIOD ORDINATES, LAG= 3.05 HOURS, CP= .45 VOL= 1.00

36.	132.	268.	418.	544.	620.	626.	578.	521.	469.
422.	380.	343.	309.	278.	250.	225.	203.	183.	165.
148.	134.	120.	108.	98.	88.	79.	71.	64.	58.
52.	47.	42.	38.	34.	31.	28.	25.	23.	20.
18.	16.	15.	13.	12.	11.	10.	9.	8.	7.
6.	6.	5.	5.	4.					

NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
-------	-------	--------	------	------	------	--------	-------	-------	--------	------	------	------	--------

SUN	22.43	20.25	2.38	173605.
	(375.)	(514.)	(60.)	(4915.95)

COMBINE HYDROGRAPHS

TOTAL INFLOW HYDROGRAPH FOR STILLWATER LAKE

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
SWTI	3	0	0	0	0	1	0	0

HYDROGRAPH ROUTING

STILLWATER LAKE OUTFLOW HYDROGRAPH

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
SWO	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IDPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTBL	LAG	AMSK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-1810.	0

CAPACITY= 0. 1335. 9670.

ELEVATION= 1802. 1810. 1820.

CREL	SPUID	COQU	EXPV	ELEV	COOL	CAREA	EXPL
1810.0	60.0	2.7	1.5	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COOD	EXPD	DAMWID
1811.5	0.0	0.0	0.

CREST LENGTH	140.	1000.
AT OR BELOW ELEVATION	1811.5	1815.0

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POCONO DAM
HYDROLOGY/HYDRAULICS

SH. 12 OF 22

SUB-AREA RUNOFF COMPUTATION

INFLOW FROM NORTH

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
LNM	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUNG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISANE	LOCAL
1	1	4.27	0.00	75.40	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	22.30	87.00	100.00	111.00	118.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS .860

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.00	.05	0.00	0.00

UNIT HYDROGRAPH DATA

TP= 4.51 CP= .45 NTA= 0

RECESSION DATA

STRTO= -1.50 BRCSN= -.05 RTIOR= 2.00

UNIT HYDROGRAPH 81 END-OF-PERIOD ORDINATES, LAG= 4.53 HOURS, CP= .45 VOL= 1.00

9.	34.	70.	112.	158.	203.	239.	265.	279.	277.
261.	243.	227.	212.	197.	184.	171.	160.	149.	139.
130.	121.	113.	105.	98.	91.	85.	79.	74.	69.
64.	60.	56.	52.	49.	45.	42.	39.	37.	34.
32.	30.	28.	26.	24.	23.	21.	20.	18.	17.
16.	15.	14.	13.	12.	11.	10.	10.	9.	8.
8.	7.	7.	6.	6.	6.	5.	5.	5.	4.
4.	4.	3.	3.	3.	3.	3.	2.	2.	2.
2.									

NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
-------	-------	--------	------	------	------	--------	-------	-------	--------	------	------	------	--------

SUM 22.43 20.25 2.38 111642.
(575.)(514.)(40.)(3161.35)

SUB-AREA RUNOFF COMPUTATION

INFLOW FROM SOUTH

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
LNS	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUNG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISANE	LOCAL
1	1	2.03	0.00	75.40	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	22.30	87.00	100.00	111.00	118.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS .860

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.00	.05	0.00	0.00

UNIT HYDROGRAPH DATA

TP= 4.38 CP= .45 NTA= 0

RECESSION DATA

STRTO= -1.50 BRCSN= -.05 RTIOR= 2.00

UNIT HYDROGRAPH 80 END-OF-PERIOD ORDINATES, LAG= 4.42 HOURS, CP= .45 VOL= 1.00

5.	17.	35.	56.	80.	101.	119.	131.	136.	133.
124.	116.	108.	100.	93.	87.	81.	75.	70.	65.
61.	57.	53.	49.	46.	43.	40.	37.	34.	32.
30.	28.	26.	24.	22.	21.	19.	18.	17.	16.
15.	14.	13.	12.	11.	10.	10.	9.	8.	8.
7.	7.	6.	6.	5.	5.	5.	4.	4.	4.
4.	3.	3.	3.	3.	2.	2.	2.	2.	2.
2.	2.	2.	1.	1.	1.	1.	1.	1.	1.

NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
-------	-------	--------	------	------	------	--------	-------	-------	--------	------	------	------	--------

SUM 22.43 20.25 2.38 53103.
(575.)(514.)(40.)(1583.71)

COMBINE HYDROGRAPHS

LAKE NAORI TOTAL INFLOW HYDROGRAPH

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
LNT	3	0	0	0	0	0	0	1

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POCONO DAM
HYDROLOGY/HYDRAULICS

SH. 13 OF 22

HYDROGRAPH ROUTING

LAKE NAONI OUTFLOW HYDROGRAPH

	ISTAQ LND	ICOMP 1	IECON 0	ITAPE 0	JPLT 0	JPRT 0	INAME 0	ISTAGE 0	IAUTO 1
ROUTING DATA									
QLOSS	CLOSS	AVG	IRIS	ISAME	IOPT	IPMP		LSTR	
0.0	0.000	0.00	1	1	0	0		0	
MSTPS MSTDL LAG ANSKK X TSK STORA ISPRAT									
	1	0	0	0.000	0.000	0.000	-1755.	-1	
STAGE	1755.00	1756.00	1757.00	1758.00	1759.00	1761.00	1763.00	1765.00	
FLOW	0.00	309.00	874.00	1605.00	2471.00	4540.00	6989.00	9768.00	
CAPACITY=	0.	1492.	2832.	4422.					
ELEVATION=	1742.	1755.	1760.	1765.					
CREL SPWID COBW EXPW ELEV COOL CAREA EXPL									
	1755.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DAM DATA									
	TOPEL	COOB	EXPD	DAMWID					
	1755.4	0.0	0.0	0.					
CREST LENGTH	0.	350.	650.	2500.	3000.				
AT OR BELOW ELEVATION	1755.4	1755.7	1758.9	1760.0	1765.0				

HYDROGRAPH ROUTING

CHANNEL ROUTING OF LAKE NAONI OUTFLOW

	ISTAQ LND	ICOMP 1	IECON 0	ITAPE 0	JPLT 0	JPRT 0	INAME 1	ISTAGE 0	IAUTO 0
ROUTING DATA									
QLOSS	CLOSS	AVG	IRIS	ISAME	IOPT	IPMP		LSTR	
0.0	0.000	0.00	1	1	0	0		0	
MSTPS MSTDL LAG ANSKK X TSK STORA ISPRAT									
	1	0	0	0.000	0.000	0.000	0.	0	

NORMAL DEPTH CHANNEL ROUTING

QW(1)	QW(2)	QW(3)	ELNVT	ELMAX	RLNTH	SEL
.0650	.0450	.0650	1720.0	1740.0	9750.	.00800

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

0.00	1740.00	850.00	1725.00	975.00	1722.00	975.00	1720.00	1025.00	1720.00
1025.00	1722.00	1125.00	1725.00	2000.00	1740.00				

	0.00	11.78	23.65	46.59	88.14	148.59	234.77	349.48	492.70	664.45
STORAGE	864.72	1093.51	1350.82	1636.65	1951.00	2293.88	2665.27	3065.19	3493.63	3950.59
OUTFLOW	0.00	156.92	486.58	1027.76	1945.95	3349.68	5381.23	8309.72	12292.42	17477.36
	24003.97	32004.55	41605.45	52928.04	66089.43	81202.97	98378.75	117723.90	139342.94	163337.97
STAGE	1720.00	1721.05	1722.11	1723.16	1724.21	1725.26	1726.32	1727.37	1728.42	1729.47
	1730.53	1731.58	1732.63	1733.68	1734.74	1735.79	1736.84	1737.89	1738.95	1740.00
FLOW	0.00	156.92	486.58	1027.76	1945.95	3349.68	5381.23	8309.72	12292.42	17477.36
	24003.97	32004.55	41605.45	52928.04	66089.43	81202.97	98378.75	117723.90	139342.94	163337.97

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6/18/79

Pocono Dam
Hydrology/Hydraulics

34 14 of 22

SUB-AREA RUNOFF COMPUTATION

POCONO LAKE UNCONTROLLED AREA INFLOW HYDROGRAPH

ISTAB	ICOMP	IECON	ITAPE	JPLT	JFRT	INAME	ISTAGE	IAUTO
PLI	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYD6	IUNG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	55.94	0.00	75.40	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	22.30	87.00	100.00	111.00	118.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS .860

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRIL	CNSIL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.00	.05	0.00	0.00

UNIT HYDROGRAPH DATA

TP= 8.77 CP= .45 NTA= 0

RECESSION DATA

STRIO= -1.50 QRCSN= -.05 RTIOR= 2.00

UNIT HYDROGRAPH100 END-OF-PERIOD ORDINATES, LAG= 8.84 HOURS, CP= .45 VOL= .96									
23.	87.	181.	294.	421.	561.	710.	868.	1032.	1199.
1355.	1493.	1613.	1715.	1797.	1858.	1895.	1904.	1869.	1806.
1743.	1681.	1622.	1565.	1510.	1457.	1405.	1356.	1308.	1262.
1218.	1175.	1133.	1093.	1055.	1018.	982.	947.	914.	882.
851.	821.	792.	764.	737.	711.	686.	662.	639.	616.
594.	573.	553.	534.	515.	497.	479.	462.	446.	430.
415.	401.	387.	373.	360.	347.	335.	323.	312.	301.
290.	280.	270.	261.	251.	243.	234.	226.	218.	210.
203.	196.	189.	182.	176.	169.	163.	158.	152.	147.
142.	137.	132.	127.	123.	118.	114.	110.	106.	103.

END-OF-PERIOD FLOW													
MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP 0	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP 0

SUM 22.63 20.25 2.38 1418356.
(575.)(514.)(60.)(40163.37)

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6/18/79

Pocono Dam
Hydrology / Hydraulics

pt. 15 of 22

HYDROGRAPH ROUTING

POCONO LAKE OUTFLOW HYDROGRAPH

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
PLO	1	0	0	0	0	1	0	0
ROUTING DATA								
QLOSS	CLOSS	AVG	IRIS	ISANE	IOPT	IPMP	LSTR	
0.0	0.000	0.00	1	1	0	0	0	
NSTPS NSTDL								
1	0	0	LAG	ANSKK	X	TSK	STORA	ISPRAT
			0	0.000	0.000	0.000	-1633.	-1
STAGE	1633.00	1634.00	1636.00	1638.00	1640.00	1644.00	1646.00	1650.00
FLOW	0.00	638.00	3511.00	7843.00	13399.00	27745.00	36153.00	44800.00
CAPACITY=	0.	5402.	10100.	34760.				
ELEVATION=	1593.	1633.	1640.	1660.				

CREL	SPUID	COBW	EXPW	ELEV	COOL	CAREA	EXPL
1633.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA			
TOPEL	COOD	EXPD	DAMWID
1650.0	2.5	1.5	200.

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6/10/79

Pocono Dam
Hydrology / Hydraulics

34. 16 of 22

PLAN 1 - No Upstream Dam Failures

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS		
				RATIO 1 .50	RATIO 2 .70	RATIO 3 1.00
HYDROGRAPH AT	LLI	3.39	1	2385.	3339.	4769.
	(	8.78)	(	67.53)	(94.54)	(135.05)
ROUTED TO	LLO	3.39	1	2364.	3318.	4740.
	(	8.78)	(	66.95)	(93.97)	(134.24)
HYDROGRAPH AT	PSI	3.21	1	1851.	2591.	3701.
	(	8.31)	(	52.40)	(73.37)	(104.81)
ROUTED TO	PSO	3.21	1	1777.	2523.	3636.
	(	8.31)	(	50.33)	(71.46)	(102.95)
HYDROGRAPH AT	SWI	6.56	1	4369.	6117.	8739.
	(	16.99)	(	123.73)	(173.22)	(247.46)
3 COMBINED	SWTI	13.16	1	8263.	11720.	16829.
	(	34.08)	(	233.99)	(331.86)	(476.56)
ROUTED TO	SWO	13.16	1	4978.	8357.	13681.
	(	34.08)	(	140.95)	(236.65)	(387.41)
HYDROGRAPH AT	LNS	2.03	1	1044.	1462.	2089.
	(	5.26)	(	29.57)	(41.40)	(59.15)
HYDROGRAPH AT	LNN	4.27	1	2160.	3024.	4319.
	(	11.06)	(	61.16)	(85.62)	(122.31)
3 COMBINED	LNT	19.46	1	7570.	12407.	19862.
	(	50.40)	(	214.35)	(351.32)	(562.43)
ROUTED TO	LNO	19.46	1	7419.	12186.	19750.
	(	50.40)	(	210.09)	(345.07)	(559.25)
ROUTED TO	LND	19.46	1	7360.	12071.	19591.
	(	50.40)	(	208.41)	(341.82)	(554.77)
HYDROGRAPH AT	PLI	55.94	1	16713.	23398.	33426.
	(	144.88)	(	473.26)	(662.56)	(946.52)
2 COMBINED	PLT	75.40	1	24064.	35042.	50868.
	(195.29)	(681.41)	(992.27)	(1440.43)
ROUTED TO	PLD	75.40	1	19916.	28564.	42190.
	(195.29)	(563.96)	(808.85)	(1194.68)

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6/10/79

Pocono Dam
Hydrology / Hydraulics

SH. 17 OF 22

SUMMARY OF DAM SAFETY ANALYSIS
LYNCHWOOD LAKE

PLAN 1

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	ELEVATION			MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
		INITIAL VALUE	SPILLWAY CREST	TOP OF DAM						
		1881.00	1881.00	1883.00						
		285.	285.	399.						
		0.	0.	1741.						
.50	1883.28				.28	416.	2364.	4.00	43.00	0.00
.70	1883.60				.60	434.	3318.	7.00	43.00	0.00
1.00	1883.94				.94	453.	4740.	9.00	43.00	0.00

SUMMARY OF DAM SAFETY ANALYSIS
POCONO SUMMIT

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	ELEVATION			MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
		INITIAL VALUE	SPILLWAY CREST	TOP OF DAM						
		1825.00	1825.00	1826.50						
		215.	215.	440.						
		0.	0.	121.						
.50	1827.43				.93	580.	1777.	24.00	44.50	0.00
.70	1827.68				1.18	617.	2523.	28.00	44.00	0.00
1.00	1828.00				1.50	665.	3636.	31.00	44.00	0.00

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6/10/79

Pocono Dam
Hydrology / Hydraulics

34. 18 of 22

SUMMARY OF DAM SAFETY ANALYSIS
STILLWATER LAKE

PLAN 1

RATIO OF PMF	MAXIMUM RESERVOIR U.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
	ELEVATION		INITIAL VALUE	SPILLWAY CREST		TOP OF DAM	
	STORAGE		1810.00	1810.00		1811.50	
	OUTFLOW		1335.	1335.		2585.	
			0.	0.		298.	
.50	1813.80	2.30	4503.	4978.	43.00	47.00	0.00
.70	1814.53	3.03	5111.	8357.	46.50	46.00	0.00
1.00	1815.38	3.88	5818.	13681.	49.50	45.00	0.00

SUMMARY OF DAM SAFETY ANALYSIS
LAKE NAOMI

RATIO OF PMF	MAXIMUM RESERVOIR U.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
	ELEVATION		INITIAL VALUE	SPILLWAY CREST		TOP OF DAM	auxiliary spillway crest; embankment low point, 1758.9
	STORAGE		1755.00	1755.00		1755.40	
	OUTFLOW		1492.	1492.		1599.	
			0.	0.		124.	
.50	1758.18	2.78	2345.	7419.	64.00	47.00	0.00
.70	1759.11	3.71	2593.	12186.	65.50	46.00	0.00
1.00	1759.96	4.56	2822.	19750.	66.50	45.00	0.00

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6/18/79

Pocono Dam
Hydrology/ Hydraulics

34. 19 OF 22

PLAN 1

PLAN 1 STATION LND

DOWNSTREAM OF LAKE NAOMI		
RATIO	FLOW, CFS	TIME HOURS
.50	7360.	47.50
.70	12071.	46.50
1.00	19591.	45.50

SUMMARY OF DAM SAFETY ANALYSIS

POCONO DAM

RATIO OF PMF	ELEVATION		INITIAL VALUE		SPILLWAY CREST		TOP OF DAM		DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
	MAXIMUM RESERVOIR U.S.ELEV	STORAGE	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	MAXIMUM OUTFLOW CFS	MAXIMUM STORAGE AC-FT	MAXIMUM STORAGE AC-FT			
.50	1641.82		0.00	12340.	19914.	19914.	1633.00	1650.00	0.00	51.50	0.00
.70	1644.19		0.00	15272.	28564.	28564.	5402.	22430.	0.00	51.50	0.00
1.00	1647.40		0.00	19220.	42190.	42190.	0.	44800.	0.00	50.50	0.00

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Pocono Dam

SH. 20 OF 22

Hydrology / Hydraulics

PLAN 2 - Upstream Dam Failures

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
 FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
 AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS		
				RATIO 1 .50	RATIO 2 .70	RATIO 3 1.00
HYDROGRAPH AT	LLI	3.39	1	2385.	3339.	4769.
	(	8.78)	(	67.53)	(94.54)	(135.05)
ROUTED TO	LLO	3.39	1	3702.	4509.	5712.
Failure assumed	(	8.78)	(	104.83)	(127.68)	(161.75)
HYDROGRAPH AT	PSI	3.21	1	1851.	2591.	3701.
	(	8.31)	(	52.40)	(73.37)	(104.81)
ROUTED TO	PSO	3.21	1	1777.	2885.	4014.
Failure assumed	(	8.31)	(	50.33)	(81.70)	(113.67)
HYDROGRAPH AT	SWI	6.56	1	4369.	6117.	8739.
	(	16.99)	(	123.73)	(173.22)	(247.46)
3 COMBINED	SWTI	13.16	1	9900.	12800.	18281.
	(	34.08)	(	280.32)	(362.47)	(517.66)
ROUTED TO	SWO	13.16	1	5326.	9009.	14481.
No failure assumed	(	34.08)	(	150.82)	(255.10)	(410.04)
HYDROGRAPH AT	LNS	2.03	1	1044.	1462.	2089.
	(	5.26)	(	29.57)	(41.40)	(59.15)
HYDROGRAPH AT	LNN	4.27	1	2160.	3024.	4319.
	(	11.06)	(	61.16)	(85.62)	(122.31)
3 COMBINED	LNT	19.46	1	8060.	13128.	20669.
	(	50.40)	(	228.23)	(371.76)	(585.29)
ROUTED TO	LNO	19.46	1	8208.	13208.	20761.
Failure assumed	(	50.40)	(	232.43)	(374.02)	(587.88)
ROUTED TO	LND	19.46	1	8141.	13111.	20587.
	(	50.40)	(	230.53)	(371.25)	(582.95)
HYDROGRAPH AT	PLI	55.94	1	16713.	23398.	33426.
	(	144.88)	(	473.26)	(662.56)	(946.52)
2 COMBINED	PLT	75.40	1	24798.	36015.	51752.
	(	195.29)	(	702.20)	(1019.83)	(1465.45)
ROUTED TO	PLO	75.40	1	20451.	29547.	43221.
No failure assumed	(	195.29)	(	579.10)	(836.67)	(1223.90)

MFB

6/18/79
Rev 7/25/79Pocono Dam
Hydrology / Hydraulics

SH. 21 OF 22

PLAN 2

SUMMARY OF DAM SAFETY ANALYSIS

LYNCHWOOD LAKE - Failure Assumed

	ELEVATION	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM	Emergency Spillway		
					Storage	Outflow	Crest
		1881.00	1881.00	1881.50			
		285.	285.	314.			
		0.	0.	22.			

RATIO OF PMF	MAXIMUM RESERVOIR U.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.50	1883.07	1.57	403.	3818.	11.92	43.17	41.50
.70	1883.03	1.53	401.	4705.	13.17	42.42	40.50
1.00	1883.18	1.68	410.	6031.	14.42	42.25	40.00

SUMMARY OF DAM SAFETY ANALYSIS

POCONO SUMMIT - Failure Assumed

	ELEVATION	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM			
					Storage	Outflow	
		1825.00	1825.00	1826.50			
		215.	215.	440.			
		0.	0.	121.			

RATIO OF PMF	MAXIMUM RESERVOIR U.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.50	1827.43	.93	580.	1777.	24.00	44.50	0.00
.70	1827.58	1.08	601.	2885.	8.00	44.50	42.50
1.00	1827.74	1.24	626.	4018.	9.00	44.25	41.50

SUMMARY OF DAM SAFETY ANALYSIS

STILLWATER LAKE - No Failure Assumed

	ELEVATION	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM			
					Storage	Outflow	
		1810.00	1810.00	1811.50			
		1335.	1335.	2585.			
		0.	0.	298.			

RATIO OF PF	MAXIMUM RESERVOIR U.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.50	1813.89	2.39	4576.	5326.	42.50	46.50	0.00
.70	1814.65	3.15	5210.	9009.	43.00	46.00	0.00
1.00	1815.49	3.99	5908.	14481.	46.50	45.00	0.00

MFB 6/18/79

Pocono Dam
Hydrology / Hydraulics

sh. 22 of 22

PLAN 2

SUMMARY OF DAM SAFETY ANALYSIS

LAKE NAOMI DAM - Failure Assumed

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM	auxiliary spillway crest; embankment low point, 1758.9
ELEVATION	1755.00	1755.00	1755.40	
STORAGE	1492.	1492.	1599.	
OUTFLOW	0.	0.	124.	

RATIO OF PMF	MAXIMUM RESERVOIR U.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.50	1758.06	2.66	2311.	8208.	19.50	47.00	44.00
.70	1758.98	3.58	2560.	13208.	22.50	46.00	43.00
1.00	1759.84	4.44	2790.	20761.	25.50	45.00	41.50

PLAN 1 STATION LND

DOWNSTREAM OF LAKE NAOMI

RATIO	MAXIMUM FLOW, CFS	MAXIMUM STAGE, FT	TIME HOURS
.50	8141.	1727.3	47.50
.70	13111.	1728.6	46.50
1.00	20587.	1730.0	45.50

SUMMARY OF DAM SAFETY ANALYSIS

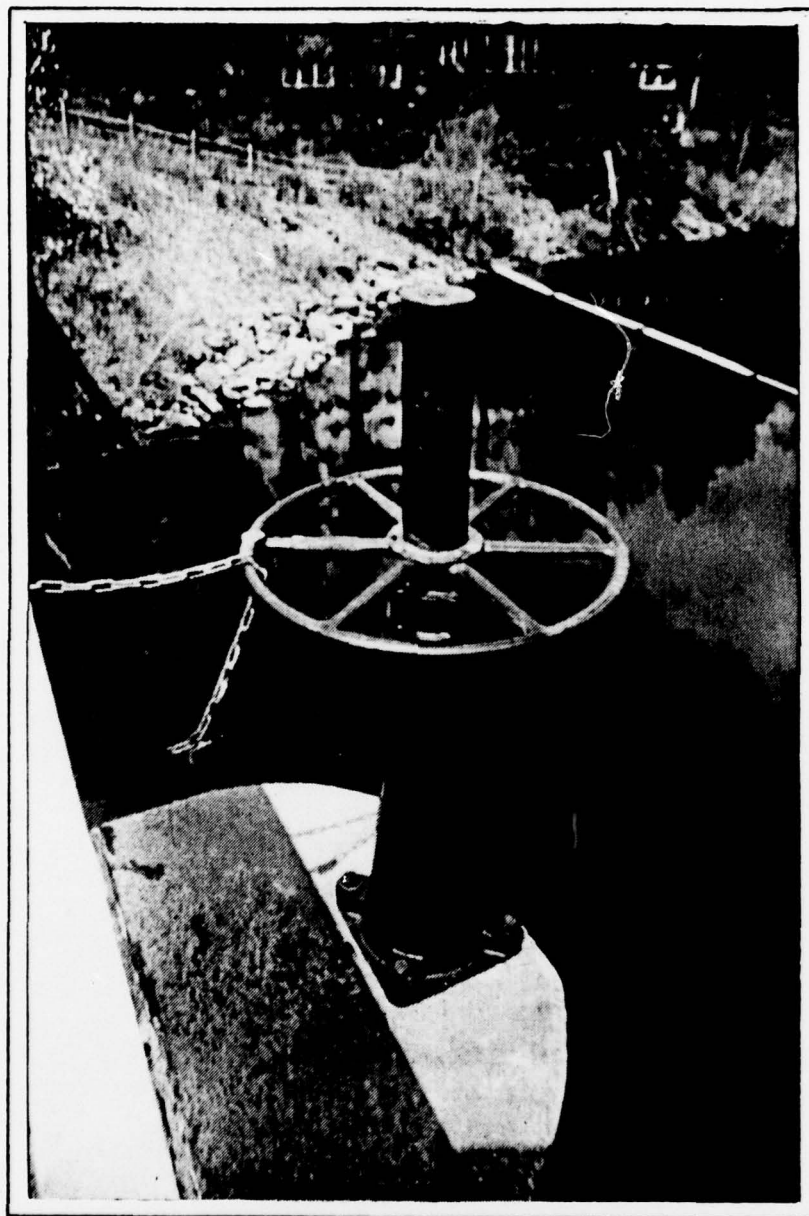
POCONO DAM - No Failure Assumed

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1633.00	1633.00	1650.00
STORAGE	5402.	5402.	22430.
OUTFLOW	0.	0.	44800.

RATIO OF PMF	MAXIMUM RESERVOIR U.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.50	1641.97	0.00	12524.	20451.	0.00	51.50	0.00
.70	1644.43	0.00	15560.	29547.	0.00	51.50	0.00
1.00	1647.63	0.00	19514.	43221.	0.00	51.00	0.00

APPENDIX

D

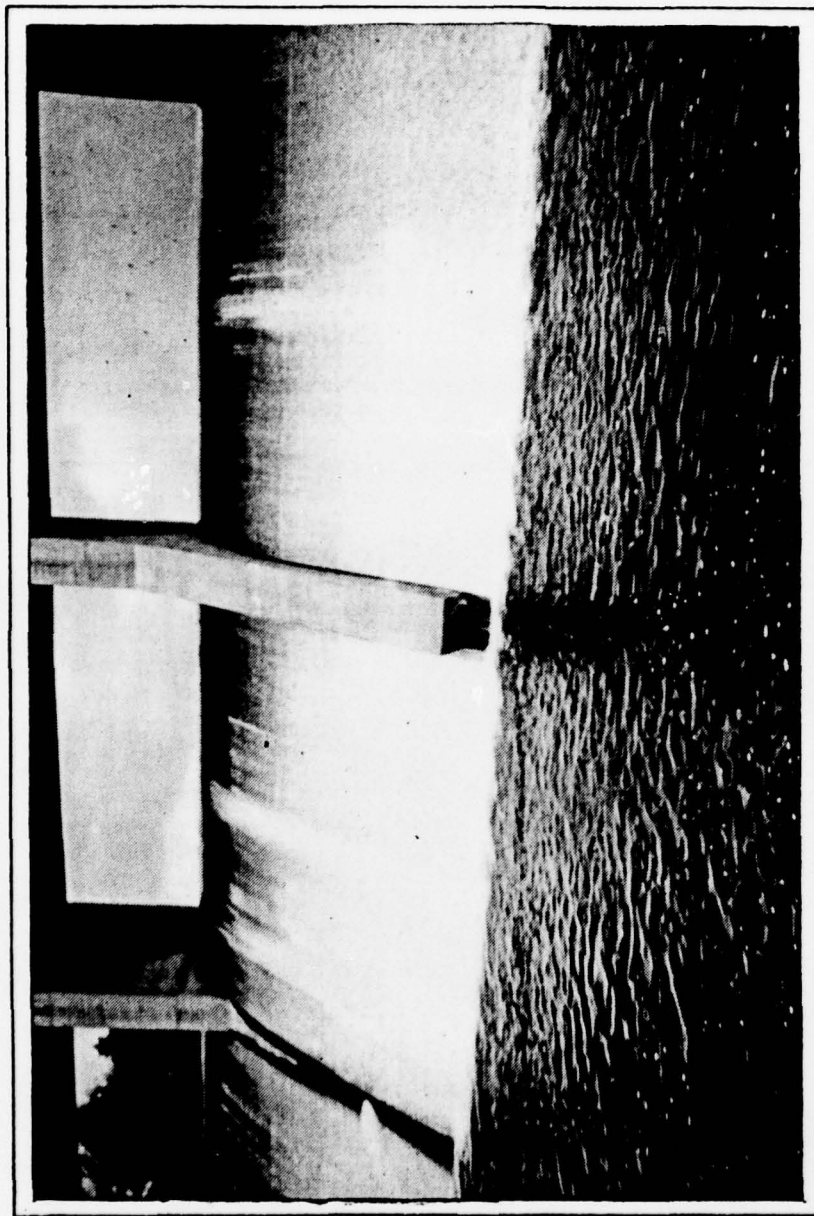


VALVE USED TO CONTROL
MINIMUM FLOW RELEASE.

PHOTOGRAPH NO. 1



TYPICAL OUTLET CONTROL VALVE.



VIEW OF SPILLWAY. NOTE MINIMUM
FLOW DISCHARGE OUTLET ON THE LEFT
OF PHOTOGRAPH.

PHOTOGRAPH NO. 3



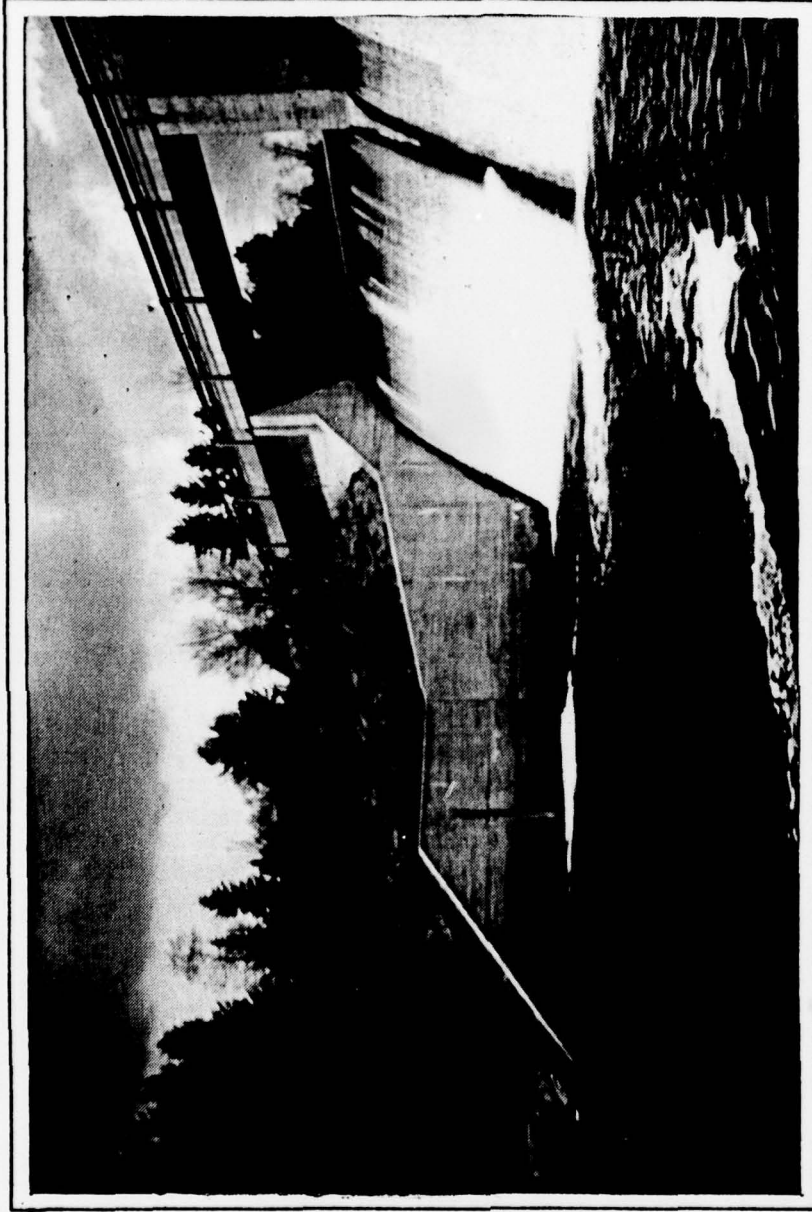
OVERVIEW OF UPSTREAM SIDE OF
SPILLWAY.

PHOTOGRAPH NO. 4



OVERVIEW OF DOWNSTREAM SIDE OF
SPILLWAY.

PHOTOGRAPH NO. 5



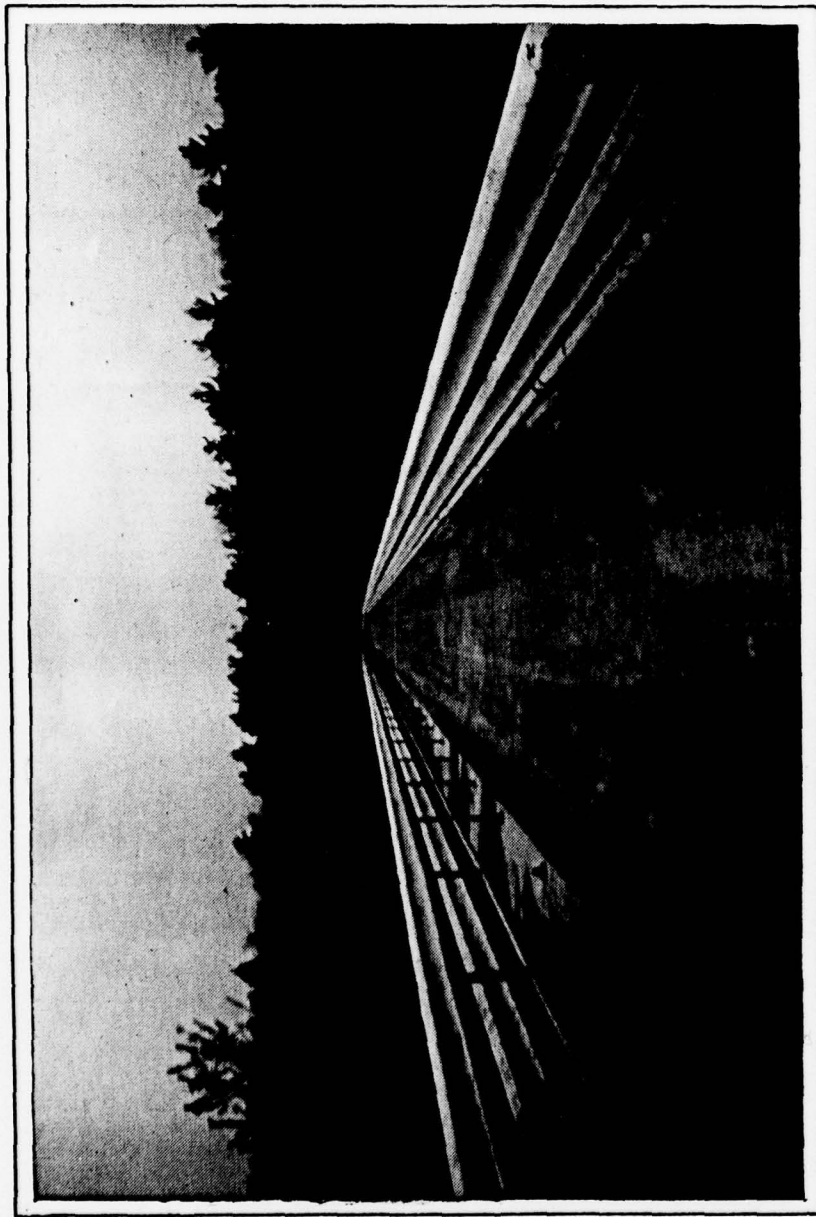
OVERVIEW OF RIGHT WALL OF SPILLWAY.
NOTE STAFF GAGE ON WALL.

PHOTOGRAPH NO. 6



OVERVIEW OF SPILLWAY DISCHARGE
CHANNEL.

PHOTOGRAPH NO. 7



LOOKING AT ROADWAY ACROSS SPILLWAY
FROM THE RIGHT ABUTMENT.

PHOTOGRAPH NO. 8



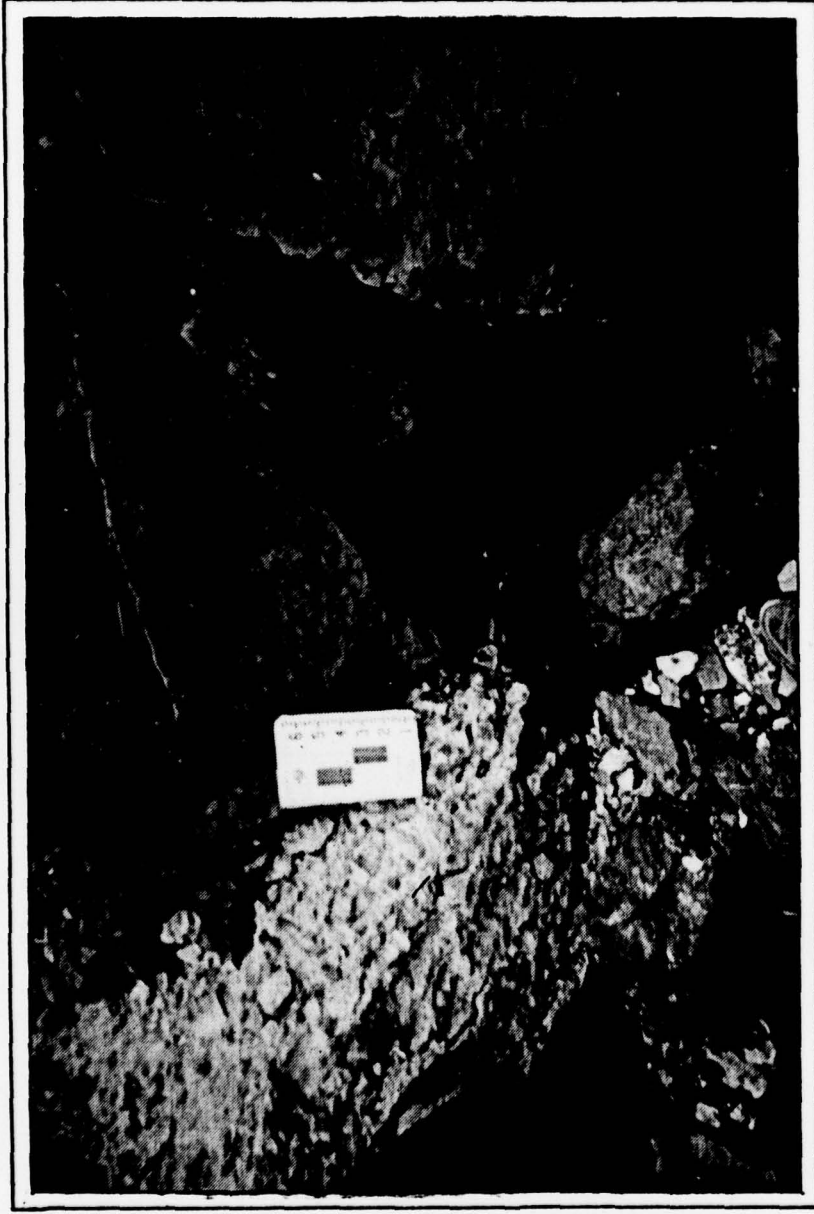
DIAGONAL CRACKING OF LEFT SPILLWAY
WALL.

PHOTOGRAPH NO. 9



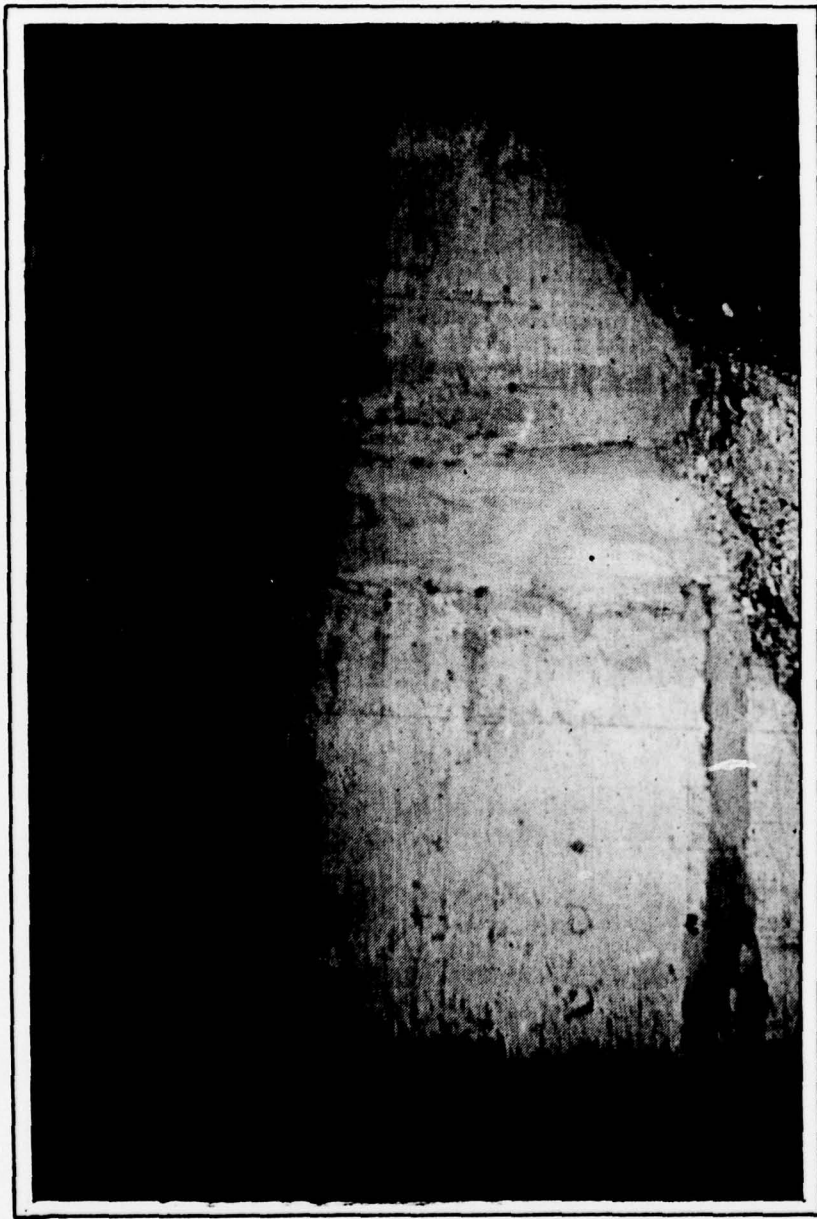
SPALLING AND GENERAL CONCRETE
DETERIORATION OF LEFT SPILLWAY
WALL AT STILLING POOL ELEVATION.

PHOTOGRAPH NO. 10



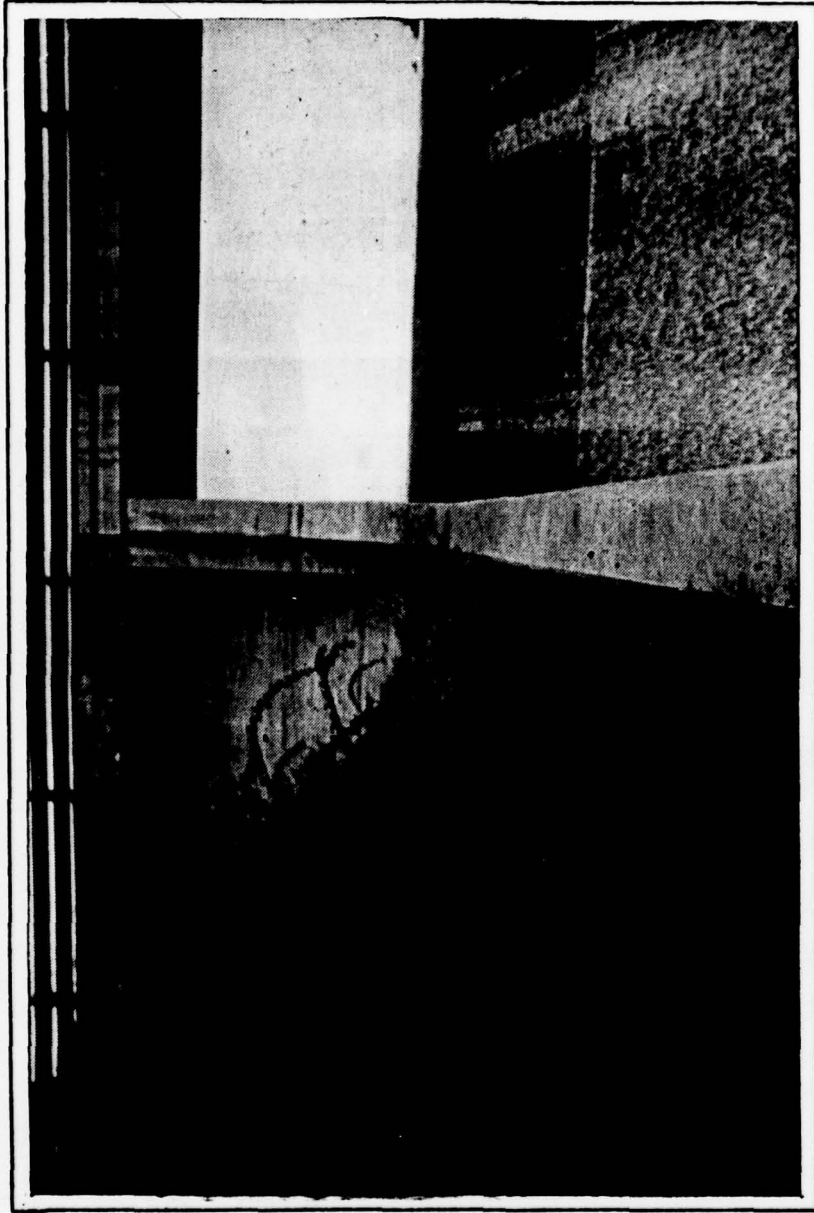
EMBANKMENT SEEPAGE DISCHARGING
AROUND END OF LEFT SPILLWAY WALL.

PHOTOGRAPH NO. 11



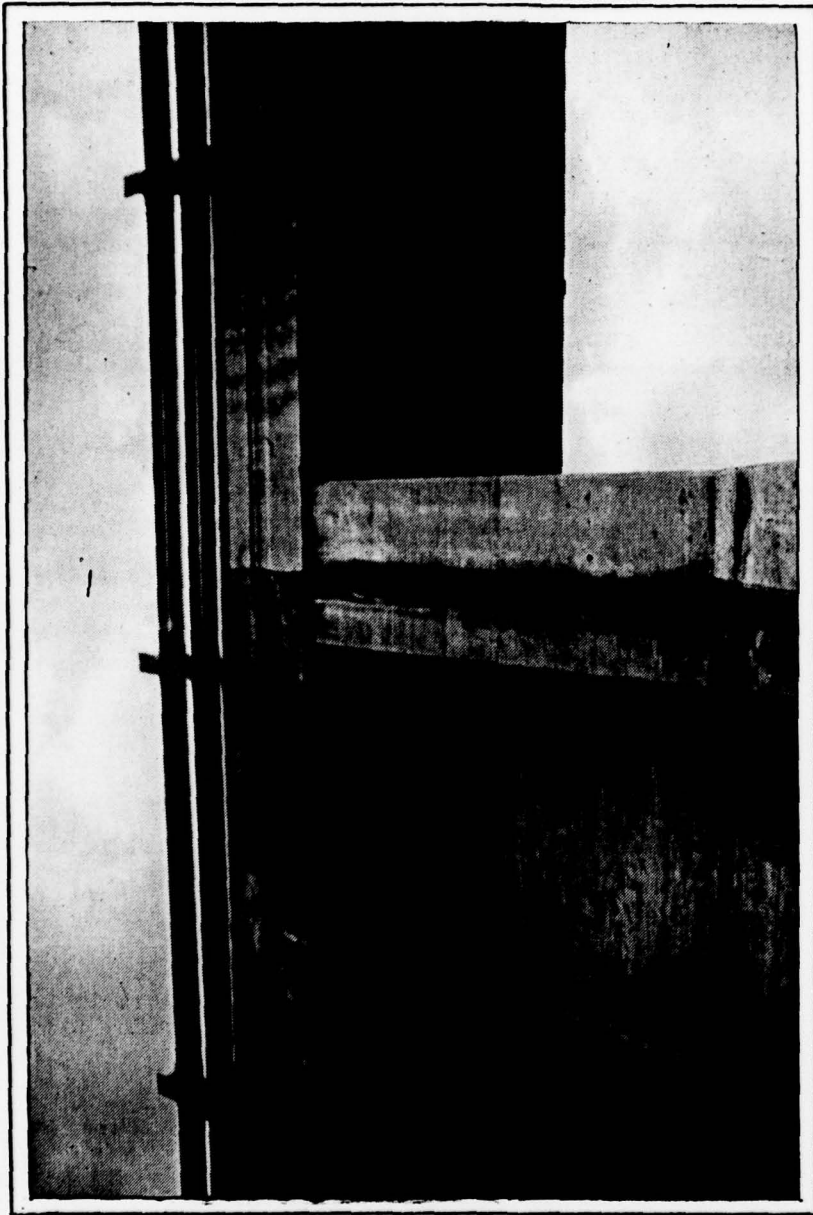
TYPICAL CONCRETE REPAIR WORK
PERFORMED ON DAM.

PHOTOGRAPH NO. 12



OVERVIEW OF RIGHT SPILLWAY ABUTMENT
LOOKING UPSTREAM.

PHOTOGRAPH NO. 13



NOTE DETERIORATION OF BRIDGE
ABUTMENT. REFER TO PHOTOGRAPH
NO. 13 FOR LOCATION.

PHOTOGRAPH NO. 14

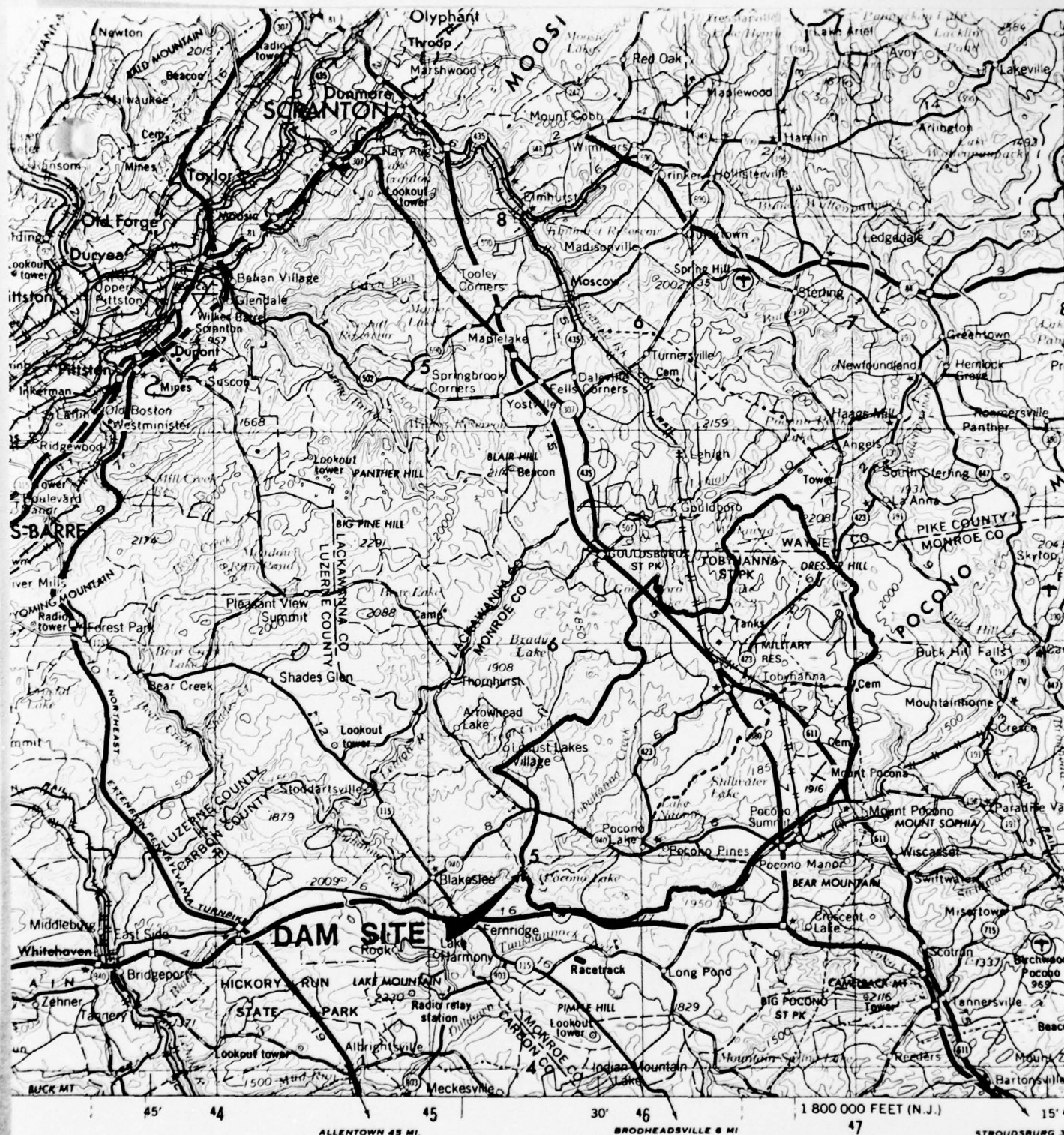


OVERVIEW OF LEFT ABUTMENT EMBANKMENT
SLOPE.

PHOTOGRAPH NO. 15

APPENDIX

E



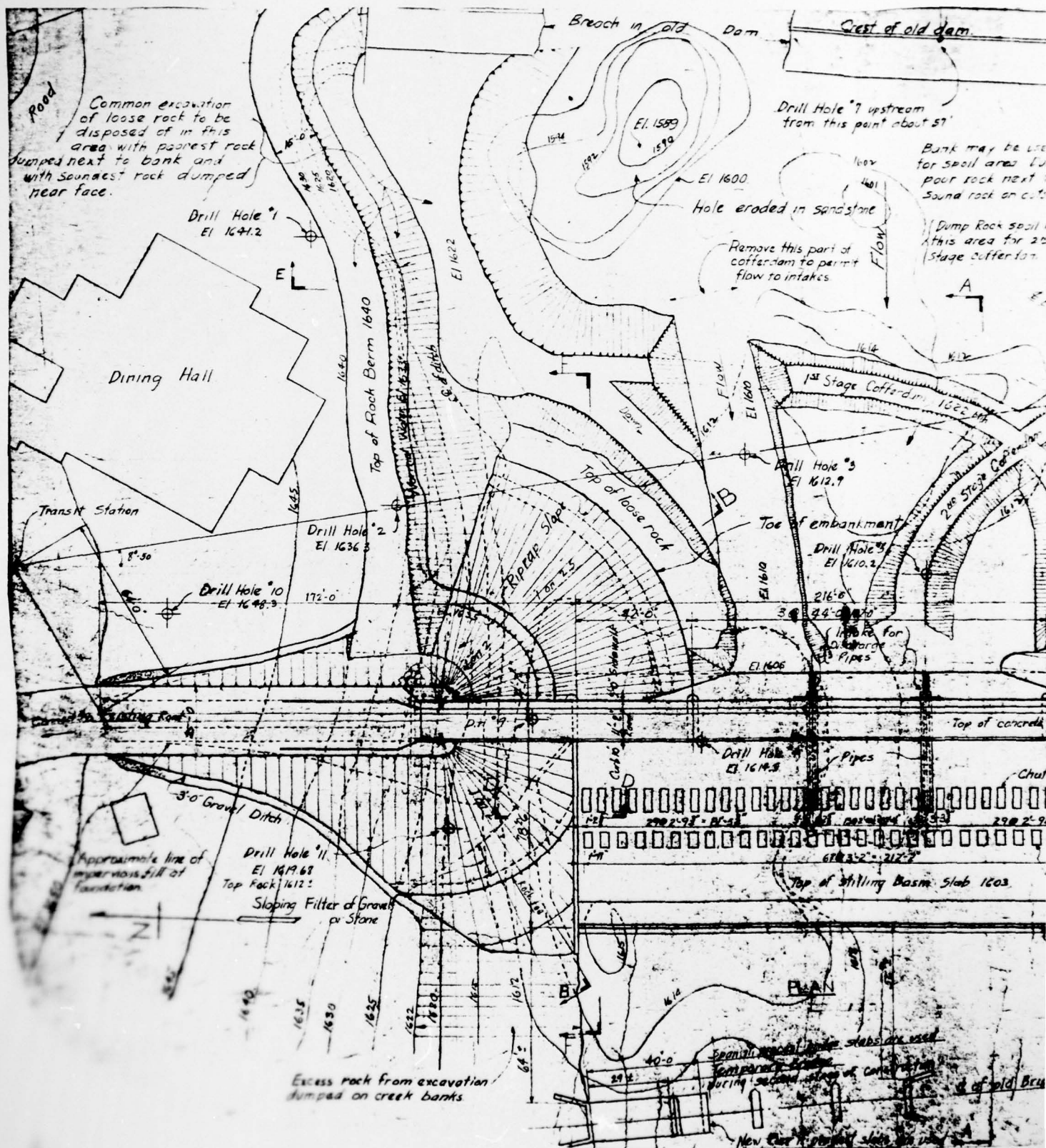
HYDROLOGIC MAP POCONO LAKE DAM

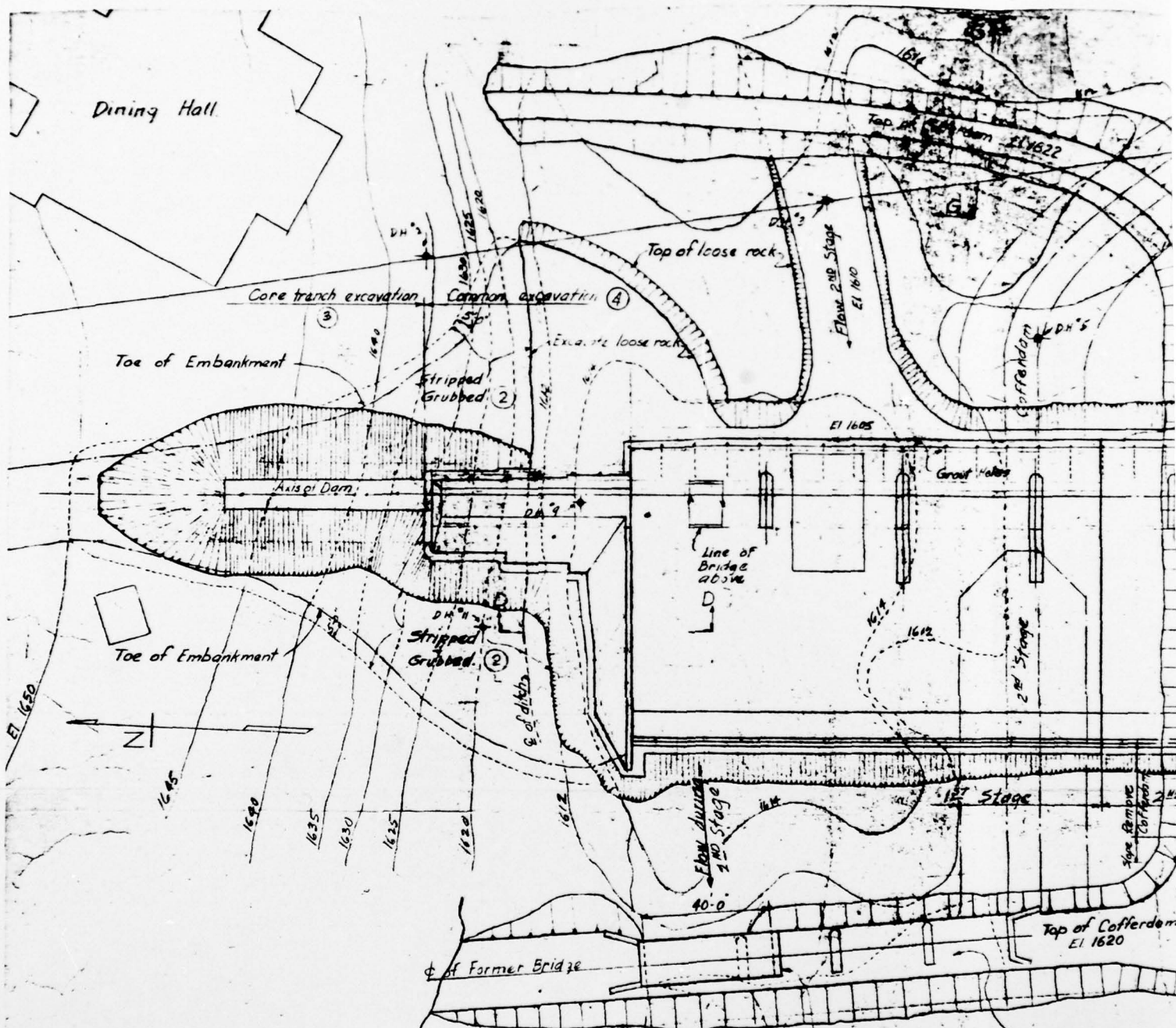
NAT.I.D.NO.PA.00781

MONROE COUNTY

DATA OBTAINED FROM U.S. GEOLOGICAL SURVEY QUAD
SHEET ENTITLED SCRANTON,PA.-N.J. 1:250,000 REV.1976

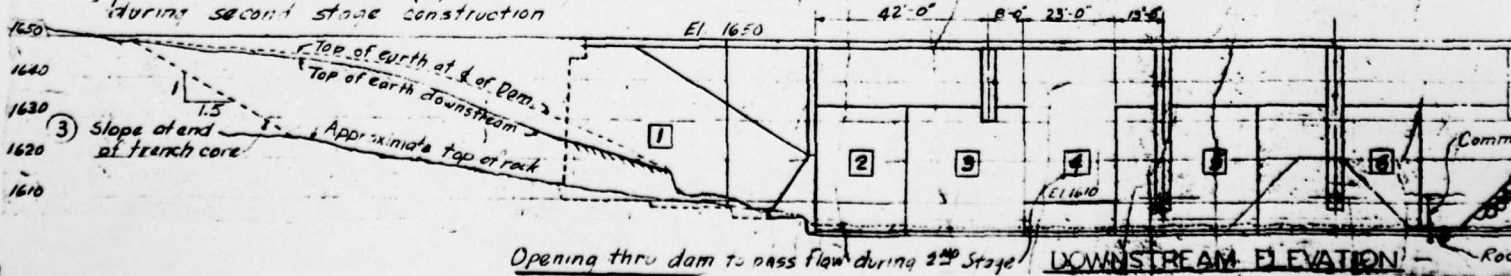
PLATE 1A

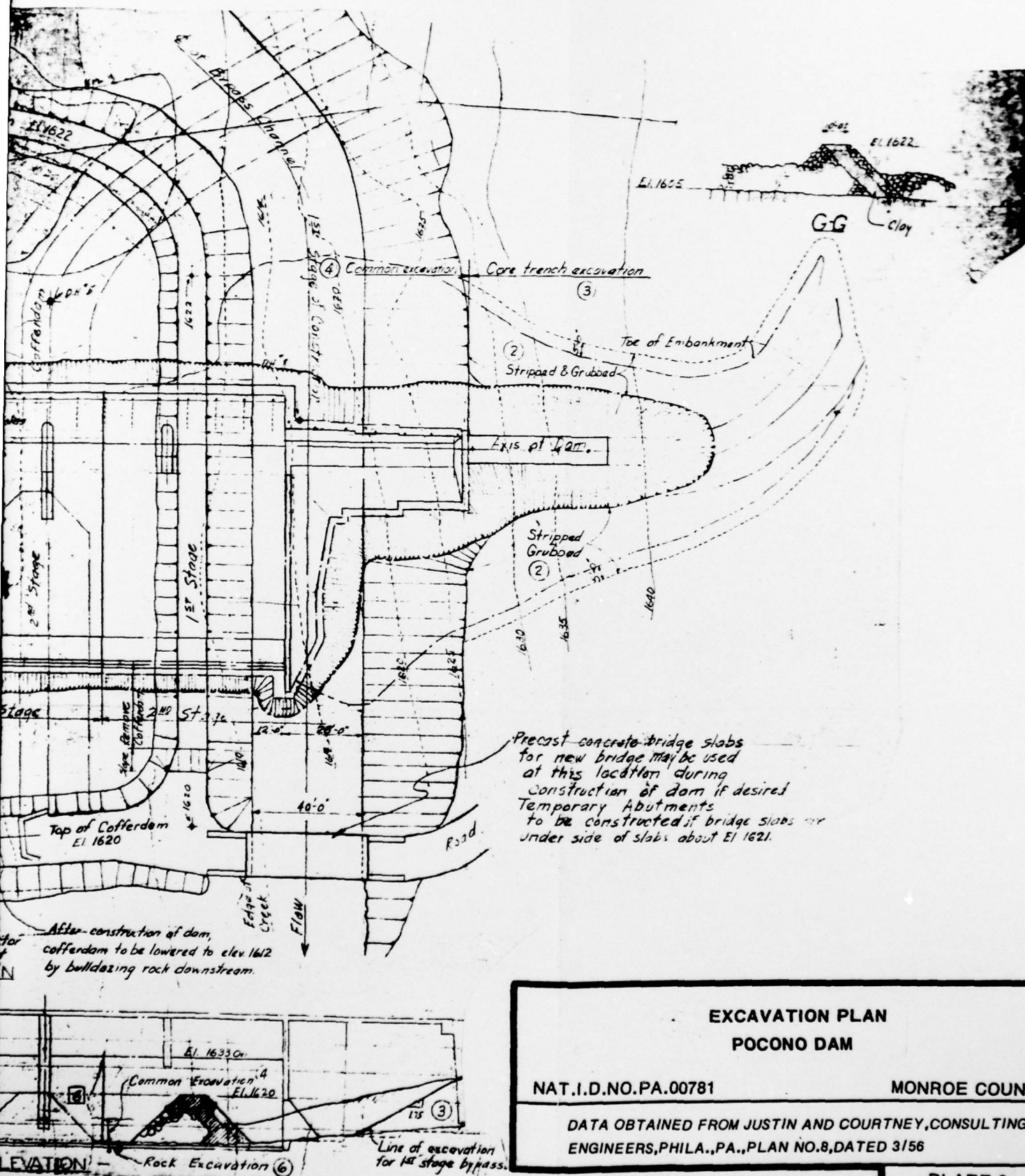




Section of earth cofferdam at bridge to be removed to permit stream flow to be passed during second stage construction

Temporary pier to be constructed if contractor proposes using precast bridge slabs
 After construction cofferdam to be lowered by bulldozing rock





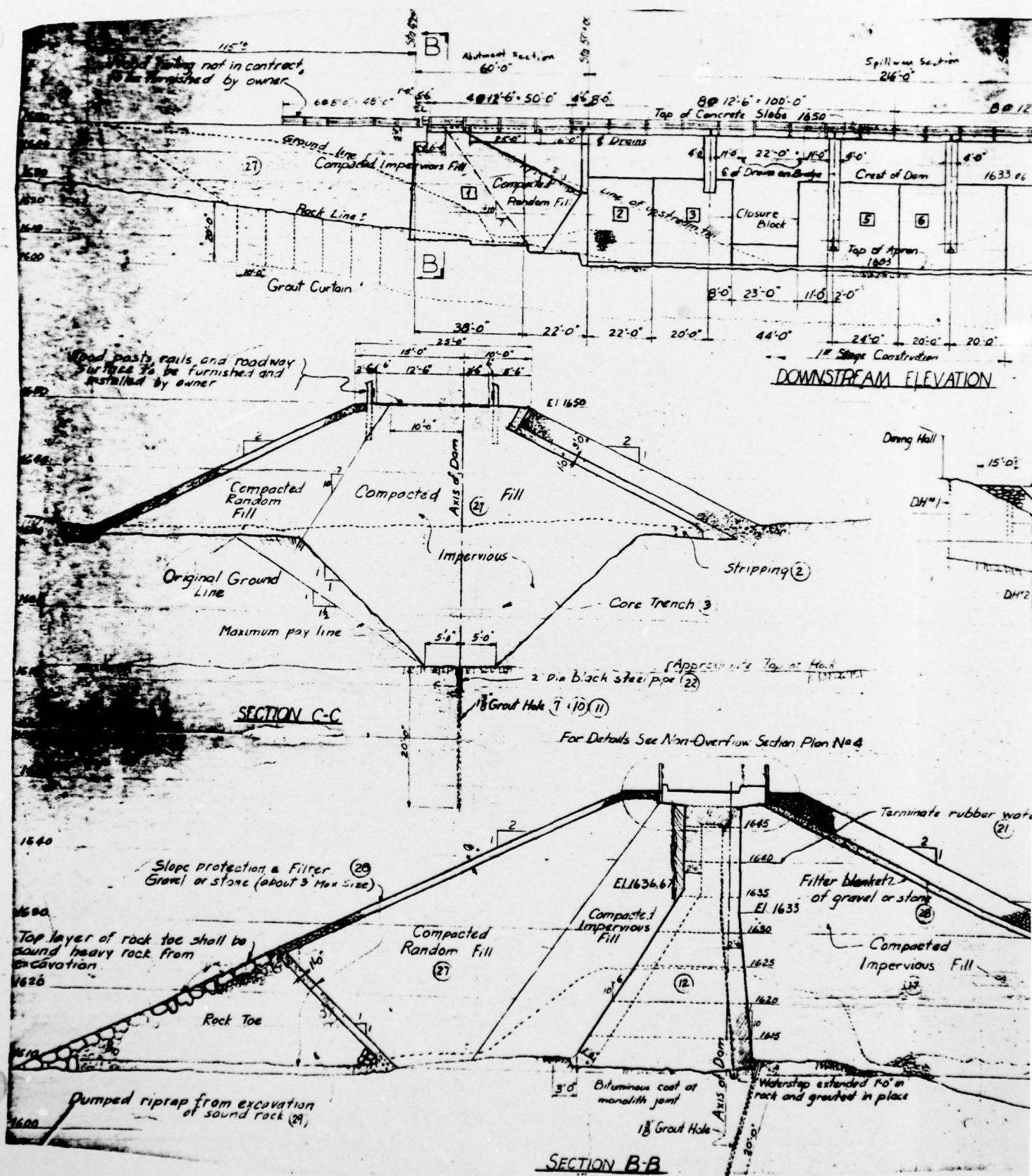
EXCAVATION PLAN POCONO DAM

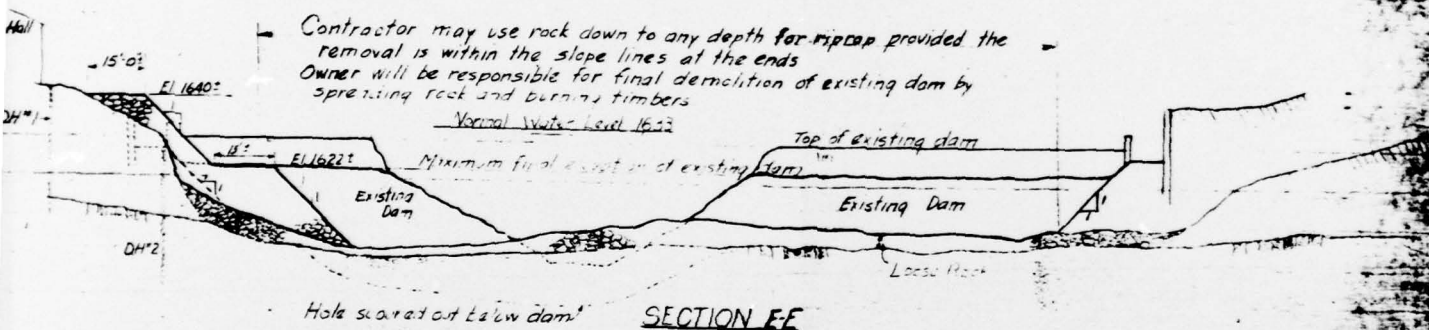
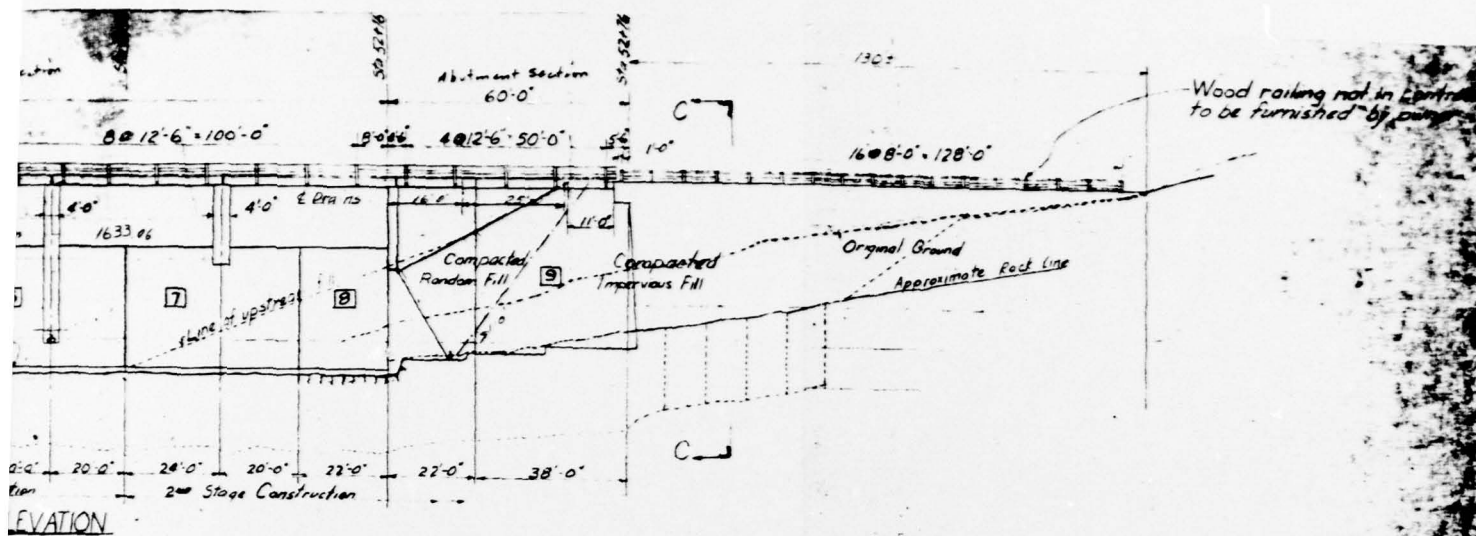
NAT.I.D.NO.PA.00781

MONROE COUNTY

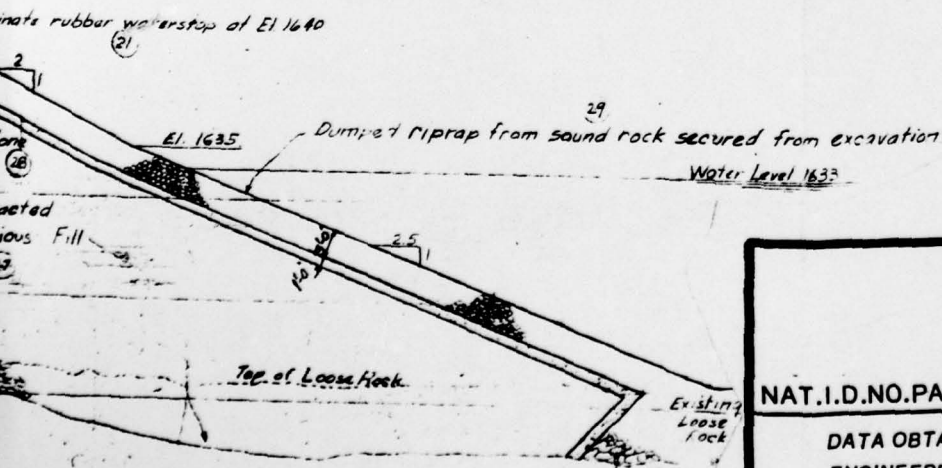
DATA OBTAINED FROM JUSTIN AND COURTNEY, CONSULTING
ENGINEERS, PHILA., PA., PLAN NO. 8, DATED 3/56

PLATE 3





GENERAL NOTES.
 Figures in squares indicate monolith numbers.
 All exposed edges shall be chamfered.
 Distance of reinforcing bars from face.
 Figures in circles indicate the item number which payment will be made.



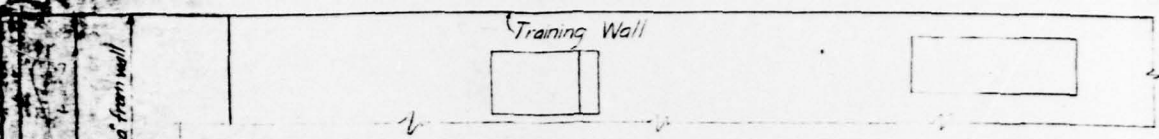
EMBANKMENT SECTIONS POCONO DAM

NAT.I.D.NO.PA.00781

MONROE COUNTY

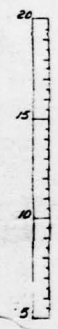
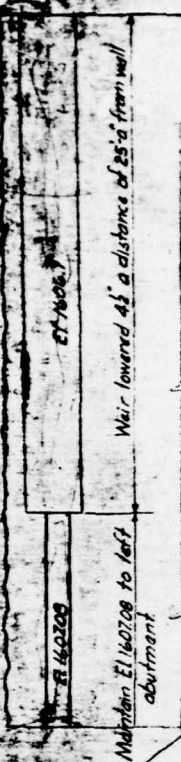
DATA OBTAINED FROM JUSTIN AND COURTNEY, CONSULTING ENGINEERS, PHILA., PA., PLAN NO. 5, DATED 3/56

PLATE 5



Discharge thru valve in low water periods shall be sufficient to pass a 4" depth of water over weir.

PLAN



Staff gage furnished and installed by owner.

Pipe cut off flush with concrete face

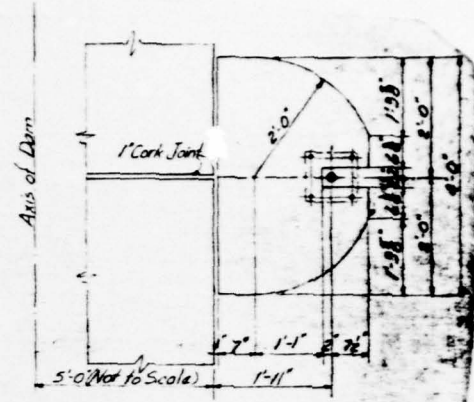
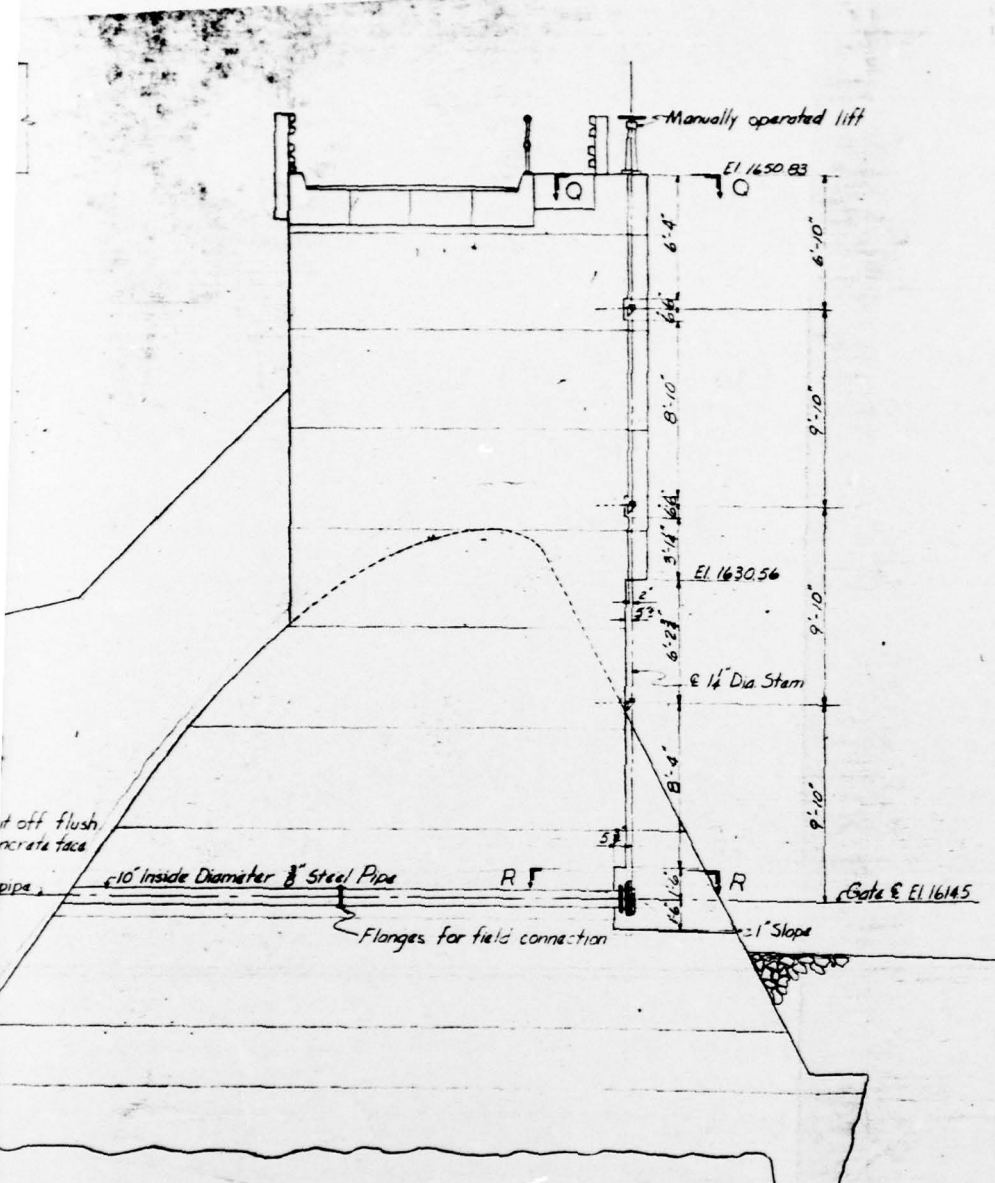
6" of pipe

10" Inside Diameter

SECTION THRU SLUICE AT PIER ADJACENT TO RIGHT ABUTMENT

42'-0" to right abutment

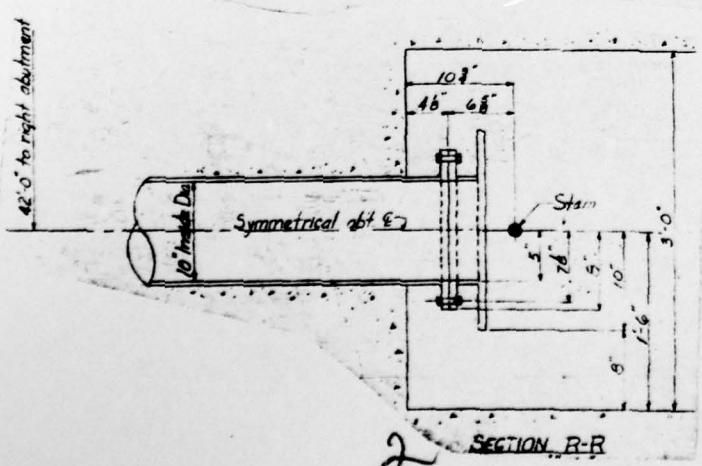




SECTION O-O

Upstream staff gage furnished and installed by owner.

This plan submitted to satisfy condition 13 of Permit (File No 45-222) sent to Pocono Lake Preserve for a dam across Tobyhanna Creek in Tobyhanna Township, Monroe County

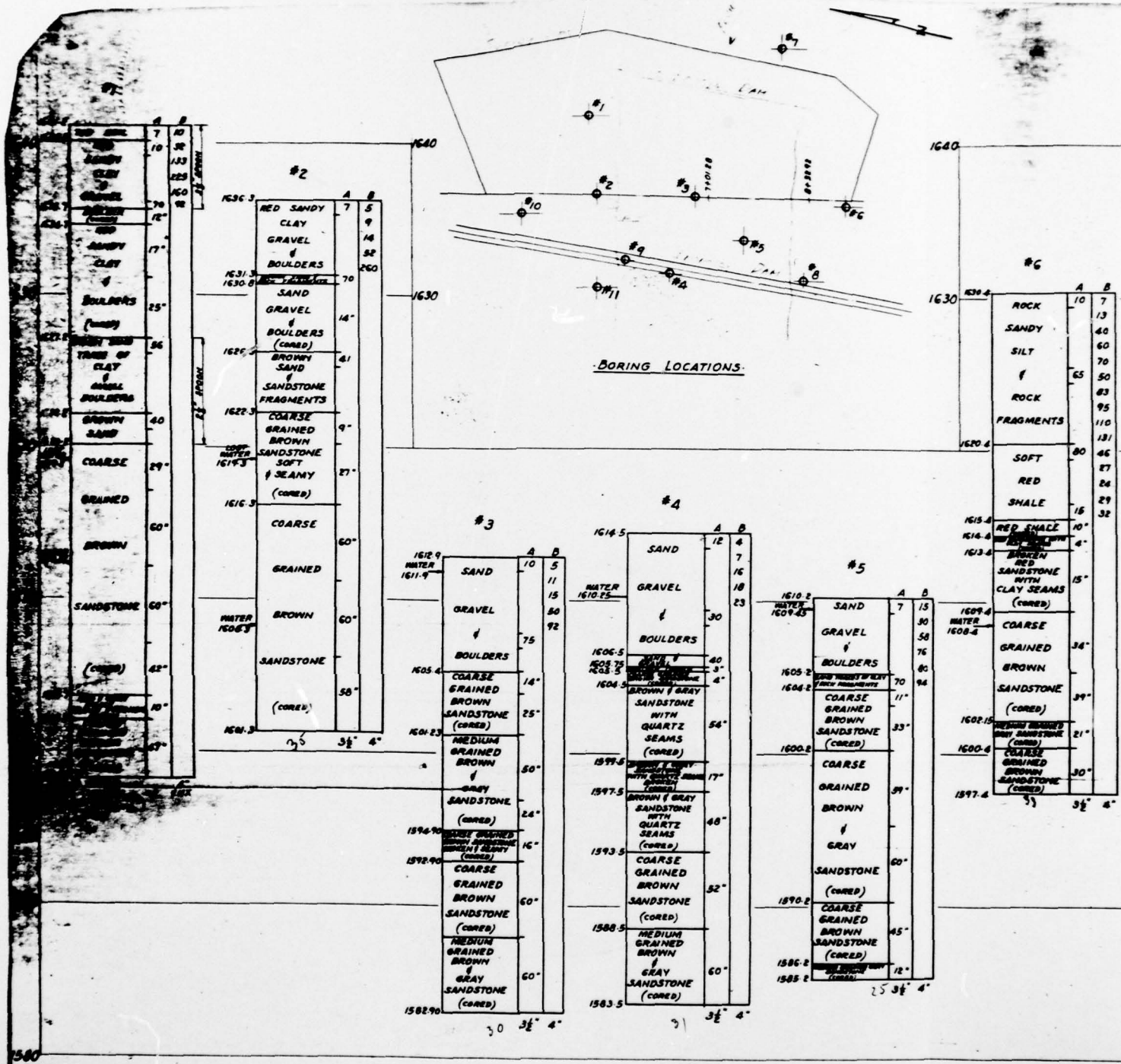


OUTLET AND LOW FLOW DISCHARGE POCONO DAM

NAT.I.D.NO.PA.00781

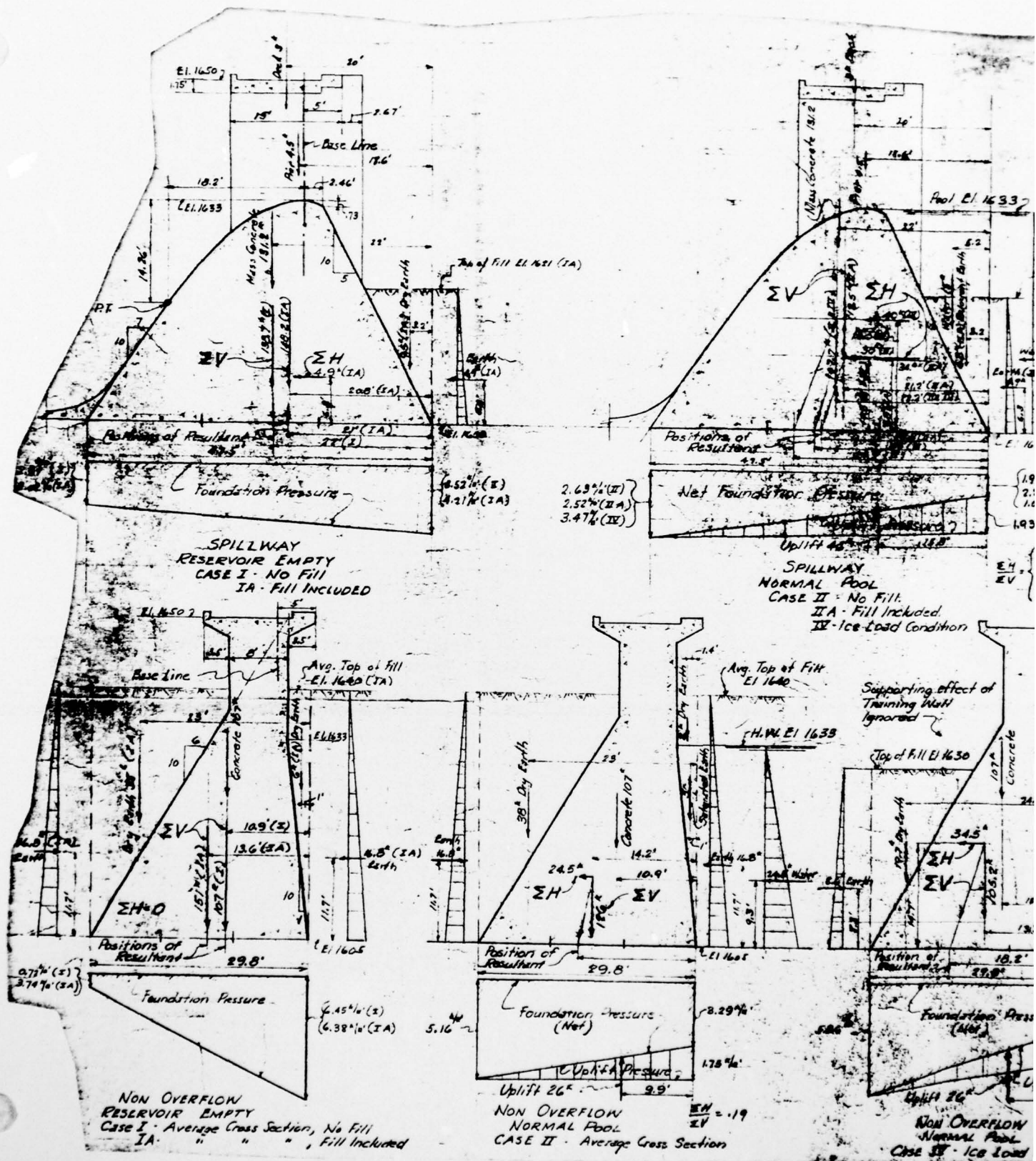
MONROE COUNTY

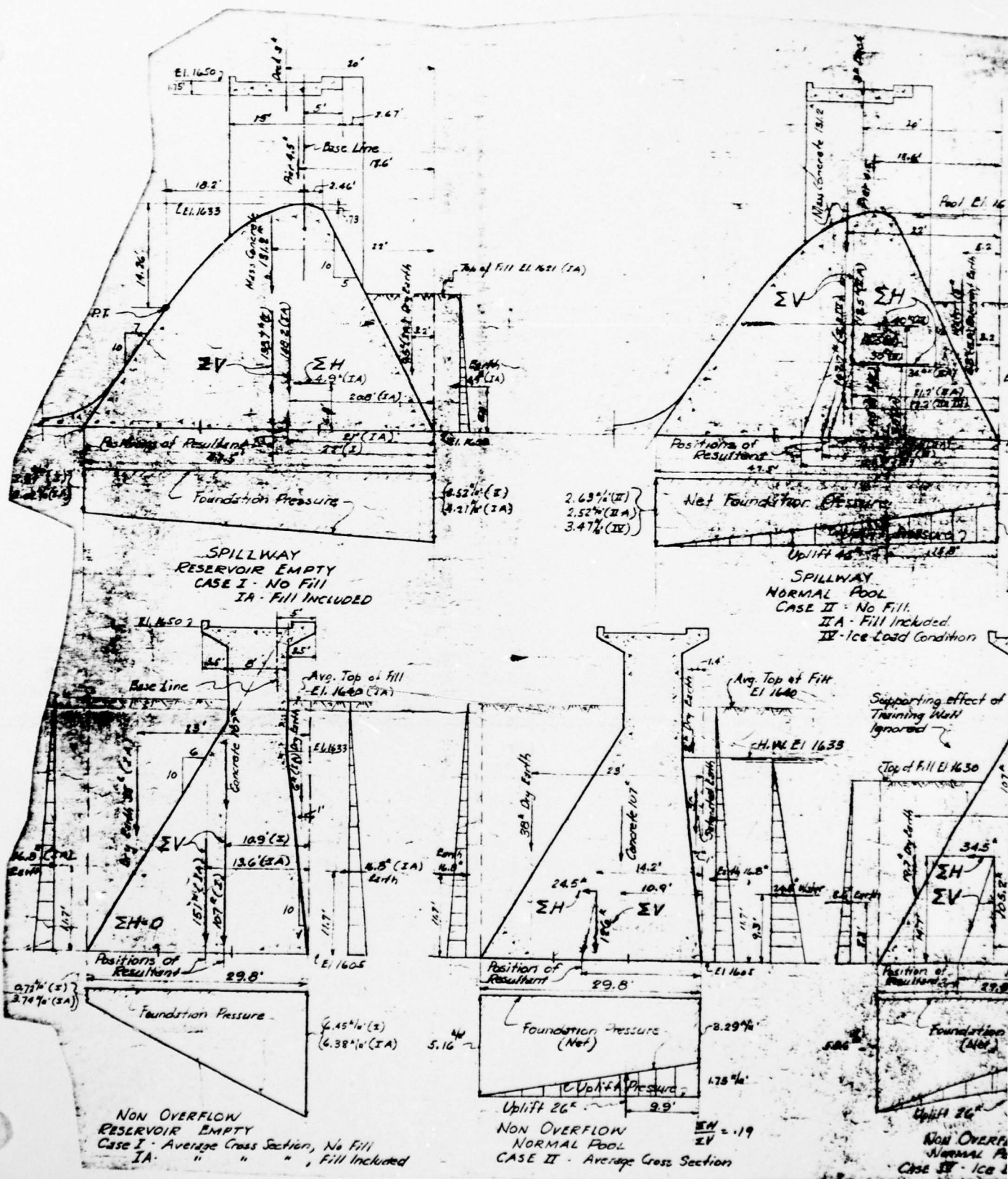
DATA OBTAINED FROM JUSTIN AND COURTNEY, CONSULTING ENGINEERS, PHILA., PA., PLAN NO.9, DATED 4/25/56



NOTE:

COLUMN A DENOTES
COLUMN B DENOTE
SPOON & DRIVE NA
SPOON SIZE AS IN
CASING SIZE .
CORE BIT - NX & D





AD-A078 875

WOODWARD-CLYDE CONSULTANTS PLYMOUTH MEETING PA
NATIONAL DAM INSPECTION PROGRAM. POCONO LAKE DAM (NDS I.D. NUMB--ETC(U)
JUL 79 J BOSCHUK, J H FREDERICK

F/6 13/13

DACW31-79-C-0017

NL

UNCLASSIFIED

2 OF 2

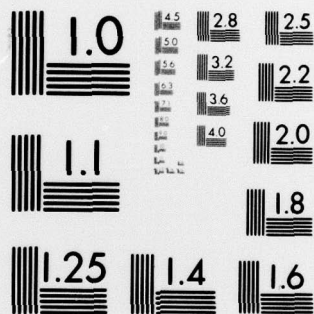
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DATE
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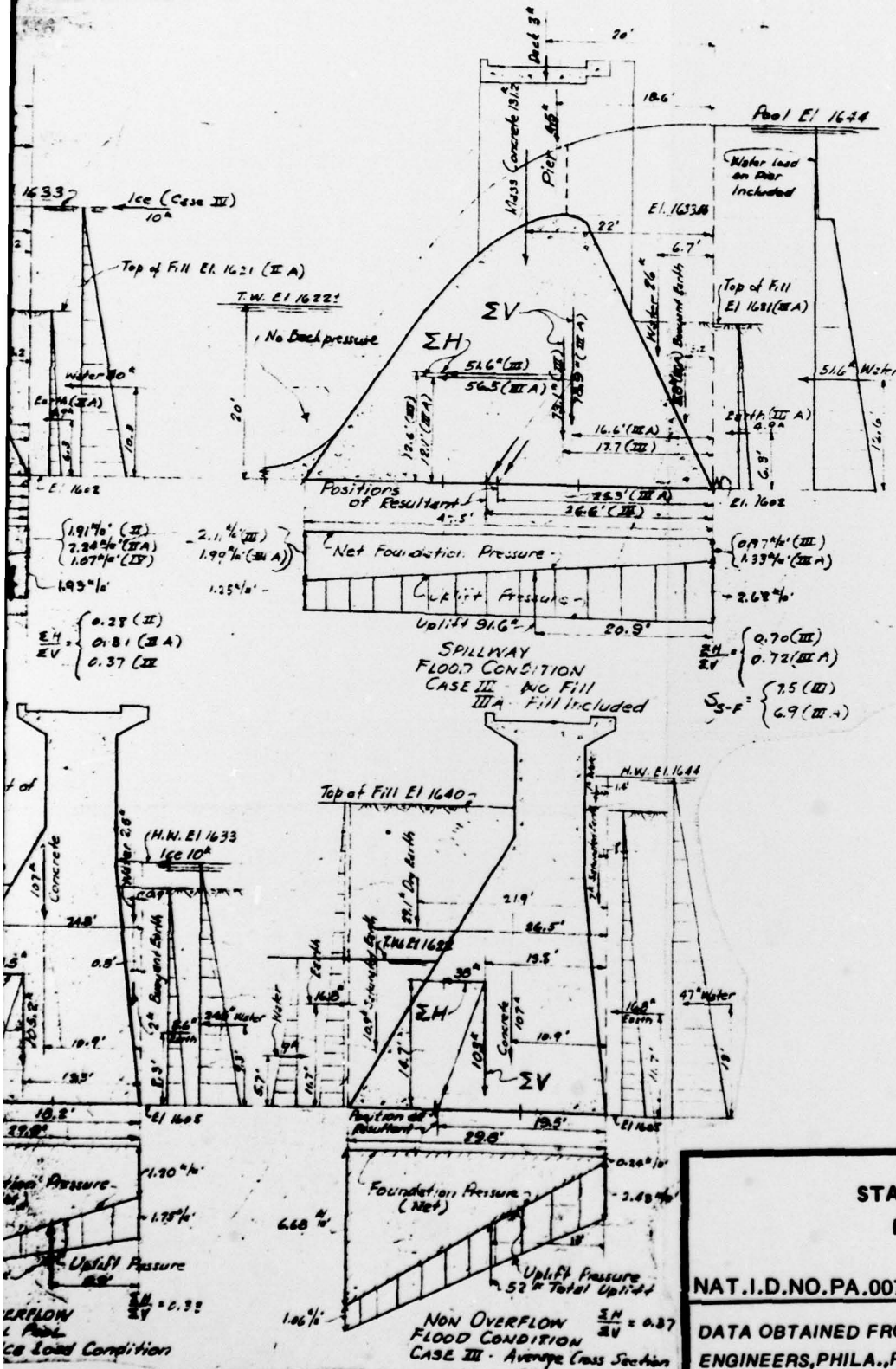
MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

Assumptions:

Uplift of full intensity at the heel varying uniformly to zero at the toe was assumed to exist over the entire base area. Concrete was assumed to weigh 150 lbs per cu. ft. and water 62.4 lbs per cu. ft. Earth was assumed to weigh 105 lbs per cu. ft. dry, 127 lbs per cu. ft. saturated, and 64.5 lbs per cu. ft. submerged. Equivalent fluid earth pressure was assumed at 27.5 lbs per sq. ft. Ice pressure was assumed at 5000 lbs per sq. ft. Ice thickness taken as 8 ft. Shear Friction Safety Factor was computed in cases where it was greater than 0.6.

Notations:

$\frac{SH}{EV}$ = Sliding Factor
 S_{s-f} = Shear Friction Safety Factor
 $S_{s-f} = \frac{fEV + \sum H}{\sum H}$
 where f = Coefficient of static friction assumed at 0.25
 $\sum V$ = Summation of vertical forces
 r = Ratio of average to maximum shearing stress at failure assumed at 0.6
 S_u = Ultimate shear resistance of horizontal joint or foundation assumed at 100 lbs per sq. ft.
 A = Area of horizontal joint in dam or foundation
 $\sum H$ = Summation of horizontal forces.



STABILITY ANALYSIS POCONO DAM

NAT.I.D.NO.PA.00781

MONROE COUNTY

DATA OBTAINED FROM JUSTIN AND COURTNEY, CONSULTING ENGINEERS, PHILA., PA., PLAN NO. D1, DATED 3/56

PLATE 8

APPENDIX

F

SITE GEOLOGY
POCONO DAM

Pocono Dam is located in the Pocono Plateau Section of the Appalachian Plateaus Physiographic Province. As shown on Plate F-1, the dam and surrounding region, as is much of northeastern Pennsylvania, are underlain by the Upper Devonian age Duncannon Member of the Catskill Formation, which is overlain by a partial mantle of Wisconsin age glacial drift. Immediately downstream of the dam is a limited exposure of sandy siltstone which strikes to the northwest and dips approximately 10 degrees to the southwest (downstream direction). A major set of high angle rock jointing strikes near east-west. Conditions favorable to seepage include the downstream direction of bedrock dip and joint pattern in addition to the nearness of bedrock to the ground surface and general character of glacial deposits.

